Service Manual

redLINE RE

Drying oven with natural convection

Model	Art. no.
RE 53 (230 V)	9090-0001, 9190-0001
RE 53-UL (100-120 V)	9090-0002, 9190-0002
RE 115 (230 V)	9090-0007, 9190-0007
RE 115-UL (100-120 V)	9090-0008, 9190-0008

redLINE RF

Drying oven with forced convection

Model	Art. no.
RF 53 (230 V)	9090-0003, 9190-0003
RF 53-UL (100-120 V)	9090-0004, 9190-0004
RF 115 (230 V)	9090-0009, 9190-0009
RF 115-UL (100-120 V)	9090-0010, 9190-0010

redLINE RI

Incubator

Model	Art. no.
RI 53 (230 V)	9090-0005, 9190-0005
RI 53-UL (100-120 V)	9090-0006, 9190-0006
RI 115 (230 V)	9090-0011, 9190-0011
RI 115-UL (100-120 V)	9090-0012, 9190-0012

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1. Introduction

This service manual describes the trouble shooting and the repair of the redLINE chambers.

The operating manual contains all information on initial operation, normal operation, cleaning and disinfection, adjustment, decommissioning and displosal of the redLINE chambers. It is required to carefully and completely read the operating manual and observe the given safety instructions.

WARNING

Failure to observe the safety instructions.

Serious injuries and unit damage.

- ➢ Observe the safety instructions in the operating manual and the service manual.
- ➢ Carefully read the complete operating manual and the service manual of the redLINE chambers.

Target group: This service manual is aimed at the service personnel of the unit dealer

The service personnel must be familiar with unit operating procedures to be able to execute the service work.

Qualification: Personnel are sufficiently qualified when meeting the following requirements:

- Electrotechnical training
- Knowledge of the most recent user and service manuals

Persons who have acquainted themselves with the contents of the user manual are qualified to install, operate, clean, and adjust redLINE chambers.

Only service engineers authorized by the equipment supplier who have undergone appropriate electrical training and who have acquainted themselves with the contents of the operating and service manuals are qualified to repair redLINE chambers.

2. Safety

This service manual is part of the scope of delivery. Always keep it at hand.

To avoid injuries and damage observe the safety instructions of the service manual.

WARNING

Failure to observe the safety instructions.

Serious injuries and unit damage.

- ➢ Observe the safety instructions in this service manual.
- ➢ Carefully read the complete service manual of the redLINE chambers.

2.1 Structure of the safety instructions

In this operating manual, the following harmonized denominations and symbols indicate dangerous situations following the harmonization of ISO 3864-2 and ANSI Z535.6.

2.1.1 Signal word panel

Depending on the seriousness and probability of the consequences, dangers are identified with a signal word, the corresponding safety color, and if appropriate, the safety alert symbol.

DANGER
Indicates an imminently hazardous situation that, if not avoided, will result in death or serious (irreversible) injury.

WARNING
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious (irreversible) injury

CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor (reversible) injury

CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in damage to the product and/or its functions or of a property in its proximity.

2.1.2 Safety alert symbol

Use of the safety alert symbol indicates **risk of injury**.

Observe all measures that are marked with the safety alert symbol in order to avoid death or injury.

2.1.3 Pictograms

Warning signs			
Electrical hazard	Stability hazard	Lifting hazard	Harmful substances
Biohazard			
Mandatory action signs			
Mandatory regulation	Read instructions		

	Information to be observed in order to ensure optimum function of the product.

2.1.4 Word message panel structure

Type / cause of hazard.

Possible consequences.

∅ Instruction how to avoid the hazard: prohibition.

➢ Instruction how to avoid the hazard: mandatory action.

Observe all other notes and information not necessarily emphasized in the same way, in order to avoid disruptions which could result in direct or indirect injury or property damage.

2.2 General safety instructions

DANGER

Danger of electric shock.

Danger of death.

➢ All work on the electrical components of the redLINE chamber shall only be carried out by qualified electricians.

➢ The redLINE chamber must be live to perform some of the diagnostic tasks described in the chapter “Troubleshooting”. Take all precautionary measures not to get in contact with live components of the unit.

➢ The redLINE chamber must be switched off prior to performing most of the service tasks described in the chap. 4 “Repair”.

➢ Disconnect the redLINE chamber from the facility-side power supply to make sure that it can not be switched on again by mistake.

WARNING

Contamination of the device with toxic, infectious or radioactive substances.

Danger of intoxication.

Danger of infection.

∅ NEVER service / repair a redLINE chamber contaminated with toxic substances or sources of infection.

➢ Prior to service / repair, remove all toxic substances and sources of infection from the chamber.

➢ Dispose of a redLINE chamber from which all toxic substances or sources of infection cannot be safely removed as special waste according to national law.

CAUTION

Sliding or tilting of the unit.

Damage to the unit.

Risk of injury by lifting heavy loads.

- Transport the redLINE chamber in its original packaging only.
- Secure the redLINE chamber with transport straps for transport.
- Do NOT lift or transport a redLINE chamber using the door handle or the door.
- Lift a redLINE chamber at its four lower corners with the aid of 2 people and place it on a transport pallet with wheels. Push the pallet to the desired site and then lift the unit from the pallet at its four lower corners.

3. Troubleshooting

Error messages and basic measures the operator himself may take to clear them are described in the chapter “Troubleshooting” of the redLINE operating manual. Please make sure these measures have been tried before looking further for any other possible error causes.

DANGER

Danger of electric shock.

Danger of death.

- The redLINE chamber must be live to perform some of the diagnostic tasks described following.
- Take all precautionary measures not to get in contact with live components of the unit.

Notations between brackets and in italics, e.g. (*-1S1*), behind a component in the troubleshooting table, refer to the respective equipment codes for this component, as specified in the wiring diagram (chap. 6), and on labels on some parts inside the chamber.

No.	Error pattern	Possible error causes / diagnosis	Remedial action
1	The housing is damaged or deformed by external mechanical impact (e.g. falling).	• Check whether the unit is still electrically safe. • Check whether the unit is still fit for normal intended use.	Straighten the housing if possible and check both electrical safety and fitness for purpose.
2a	No indications on the controller display.	Power plug not plugged in.	Connect the power plug to the power supply.
2b	No indications on the controller display.	Main switch (*-1S1*) is in position 0.	Switch the main switch to position I.
2c	No indications on the controller display.	Power cord is damaged.	Replace the power cord.
2d	No indications on the controller display.	Miniature fuse (*-X1*) is blown. Look for possible causes for the fuse blowing. • Compare the power supply voltage to the data indicated on the type plate. • Check visually for mechanical damage to the electrical cables and burn marks on the electrical cables or on electrical components. • Check the power supply. • Check the heating (see point 3b).	Replace the miniature fuse (chap. 4.7). • If the power supply voltage is not equal to the nominal voltage displayed on the type plate, the unit cannot be operated with that power supply. • If contaminated with conductive dust, clean the unit carefully. • If the cables are mechanically damaged, replace or insulate the cable in a professional manner. • If cables or components are burned, replace cable or component if possible. • If the power supply is defective, repair the power supply. • If the heating is defective, dispose of your unit.
2e	No indications on the controller display.	The pins of the main switch (*-1S1*) in the instrument panel are not connected to its cables.	Connect the pins of the main switch to its cables (chap. 4.10)
2f	No indications on the controller display.	Main switch (*-1S1*) is defective • Disconnect the cables from the pins of the main switch (chap. 4.10). • Switch the main switch to position I. • Test continuity of the main switch using a multimeter. If continuity test fails, main switch (*-1S1*) is defective.	Replace the main switch (chap. 4.10).
2g	No indications on the controller display.	Pins L and N are not connected to the controller (*-2N1*).	Connect the pins (chap. 4.9).

No.	Error pattern	Possible error causes / diagnosis	Remedial action
2h	No indications on the controller display.	Temperature fuse (*-1F2*) is blown due to an error on the controller board . • Disconnect the cables from the pins of the temperature fuse (chap. 4.14). • Test continuity between these pin*s* using a multimeter. If the continuity test fails, the temperature fuse (*-1F2*) is defective.	• Replace temperature fuse (chap. 4.14) • Replace controller (chap. 4.9).
2i	No indications on the controller display.	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
3a	Chamber does not heat up. • Controller display shows current interior temperature of chamber • Heating pilot lamp **OP1** is lit.	High voltage part of the solid state relay (*-2K1*) is defective. • Switch on the chamber and set temperature set point to maximum value. • The voltage between pins 3 and 4 (*-2K1*) must be between 6 and 10 VDC. • Measure the voltage between pins 2 (*-2K1*) and N. This must be operating voltage. Attention! 230VAC at the terminals pin3 and 4!	Replace solid state relay (chap. 4.13).
3b	Chamber does not heat up. • Controller display shows current interior temperature of chamber. • Heating pilot lamp **OP1** is lit.	Heating is defective. • Disconnect first cable for power supply of the heating (*-2E1*) from solid state relay (*-2K1*) (chap. 4.13). • Test resistance of the chamber heating between both cables using a multimeter. If the measured resistance is not the following,the heating (*-2E1*) is defective: RE/RF 53: 66 Ω ±10 % RE/RF 115: 53 Ω ±10 % RI 53: 265 Ω ±10 % RI 115: 212 Ω ±10 %	Defective heating cannot be repaired. Dispose of the chamber (refer to the operating manual).
4a	Chamber does not heat up. • Controller display shows current interior temperature of chamber. • Heating pilot lamp **OP1** is not lit.	Pins 3+ and 4- are not connected to connection (1B - 1A) of the controller (*-2N1*).	Connect the pins (chap. 4.9).

No.	Error pattern	Possible error causes / diagnosis	Remedial action
4b	Chamber does not heat up. • Controller display shows current interior temperature of chamber. • Heating pilot lamp **OP1** is not lit.	Controller (*-2N1*) is defective. • Disconnect the plug from connection (1B - 1A) of the controller board (*-2N1*). • Switch chamber on and set temperature set point to maximum value. • Measure voltage between pin 3+ and 4- of connection (1B - 1A) using a multimeter. If measured voltage is not approx. 9V DC, the controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
5	Temperature set point set on the controller is exceeded permanently.	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
6	Current interior temperature as displayed on the controller in a stable operating phase deviates by more than ±1 K from the temperature shown by the reference measuring device, ± the measurement uncertainty. Current temperature on the controller display is equal to the temperature set point.	Temperature controller is not adjusted.	Calibrate and, if appropriate, adjust temperature controller (refer to the operating manual)
7a	Fan doesn't work.	Pins L and N are not connected to the fan (*-1M1*).	Connect the pins.
7b	Fan doesn't work.	Fan is defective. Check the fan for blocking: Disconnect the unit from the power supply, remove the covers (chap. 4.15), check if you can turn the fan wheel.	Replace the fan (chap. 4.15).
7c	Fan doesn't work.	Fan is defective. If connections are ok and blocking or failure did not occur during operation: Disconnect pins L and N and measure the resistance between L and N with a multimeter. If the measuring range is below 5 Ohm or above 15 Ohm, the winding is burnt out / short-circuited.	Replace the fan (chap. 4.15).
8	Message EE.Er	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
9	Message Hw.Er	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
10	Message Err 1	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
11	Message Err2	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
12	Message Err3	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
13	Message Err5	Controller (*-2N1*) is defective.	Replace controller (chap. 4.9).
14	Message LLLL	Measured value below display range. Check connection of thermoelement (chap. 4.16).	Connect the pins.

No.	Error pattern	Possible error causes / diagnosis	Remedial action
15	Message HHHH	Measured value above display range. Check connection of thermoelement (chap. 4.16).	Connect the pins.
16	Message Err4	Keyboard failure	Do not press any key during start.
17	Message PwrF	Power supply too low.	Check power supply voltage.
18	Message Sbr	Sensor rupture. Check thermoelement (chap. 4.16).	Replace thermoelement.
19a	Message Lbr	Thermoelement defectivet. Check thermoelement (chap. 4.16).	Replace thermoelement.
19b	Message Lbr	High voltage part of the solid state relay (*-2K1*) is defective Check the solid state relay (see point 3a).	Replace the solid state relay (chap. 4.13).
19c	Message Lbr	Heating defective. Check the heating (see point 3b).	Defective heating cannot be repaired. Dispose of the chamber (refer to the operating manual).
20a	Message LdF	High voltage part of the solid state relay (*-2K1*) is defective Check the solid state relay (see point 3a).	Replace the solid state relay (chap. 4.13).
20b	Message LdF	Heating defective. Check the heating (see point 3b).	Defective heating cannot be repaired. Dispose of the chamber (refer to the operating manual).

4. Repair

WARNING

Contamination of the device with toxic, infectious or radioactive substances.

Danger of intoxication.

Danger of infection.

∅ NEVER service / repair a redLINE chamber contaminated with toxic substances or sources of infection.

➢ Prior to service / repair, remove all toxic substances and sources of infection from the chamber.

➢ Dispose of a redLINE chamber from which all toxic substances or sources of infection cannot be safely removed as special waste according to national law.

The following chapter provides the service technician with all the information required to mount and dismount components.

DANGER

Danger of electric shock.

Danger of death.

➢ The redLINE chamber must be live to perform some of the diagnostic tasks described following.

➢ Take all precautionary measures not to get in contact with live components of the unit.

4.1 Replacing a unit foot (RE / RF / RI)

Spare part	A10.1 to A10.2 (chap. 5)
Required Tools	Crosstip screwdriver

	Put down a blanket to cover the working area. This will protect the powder coated surfaces from scratching.

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove everything from the inside of the unit (incl. trays).
3. Place the unit on its side.
4. Unscrew the screw (B).
5. Remove the unit foot (A).
6. Mount the new foot by following steps 1. to 5. in reverse order.

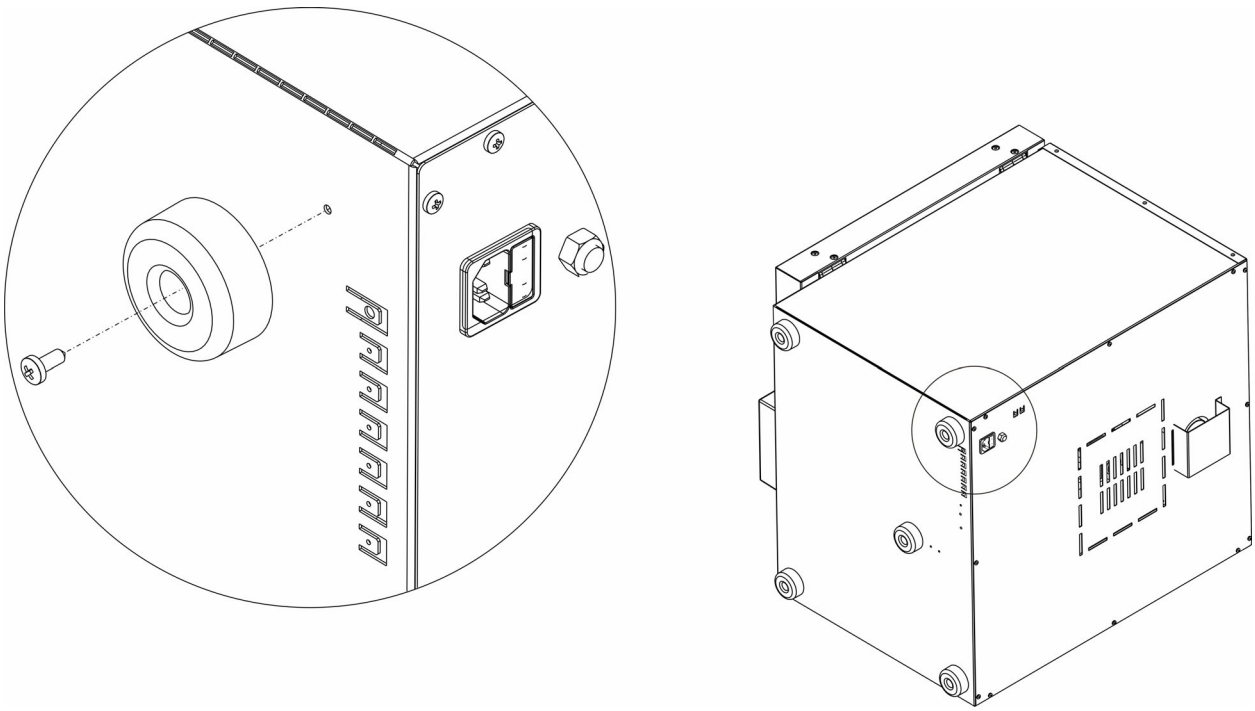


Figure 1: Replacing the unit feet

A	Unit foot	B	Screw

4.2 Replacing the door gasket (RE / RF)

Spare part	A3.1 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove the old door gasket (A).
3. Position the new door gasket on the upper door gasket edges (1) + (2).
4. Press the door gasket down onto the horizontal top part of the gasket edge.
5. Position the door gasket on the lower right gasket edge (3).
6. Pull the door gasket down diagonally (4) until you can press the vertical and horizontal parts of the gasket onto all gasket edges.

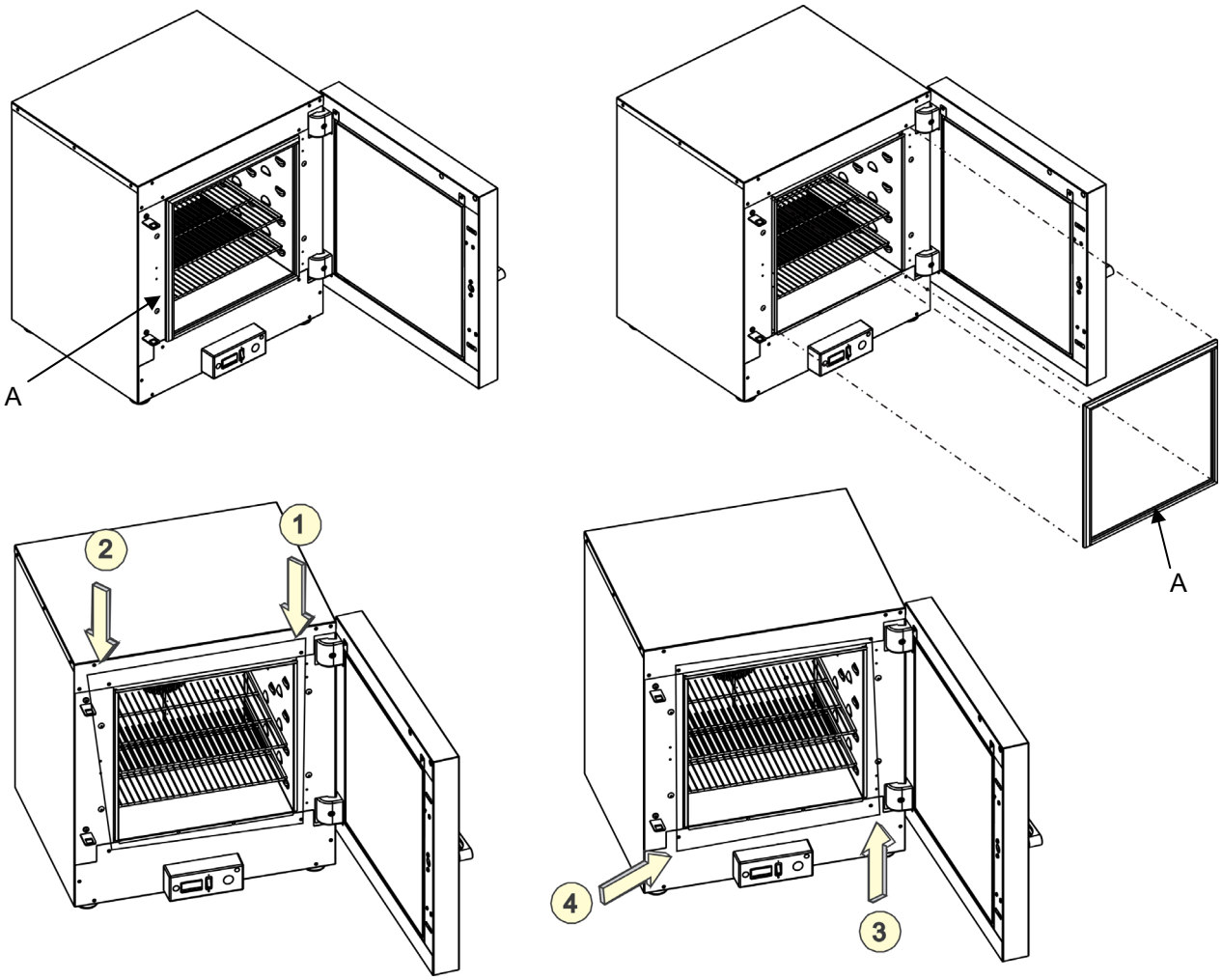


Figure 2: Replacing the door gasket

A	Door gasket		

4.3 Replacing the outer door gasket (RI)

Spare part	A3.2 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the incubator RI from the facility-side power supply.
2. Unscrew the 16 screws (C) holding the door panel (B). The screws are hidden by the outer door gasket (A).
3. Remove the door panel (B) with the gasket (A).
4. Remove the old door gasket (A) from the edges of the door panel.
5. Mount the new gasket by following steps 1. to 4. in reverse order.

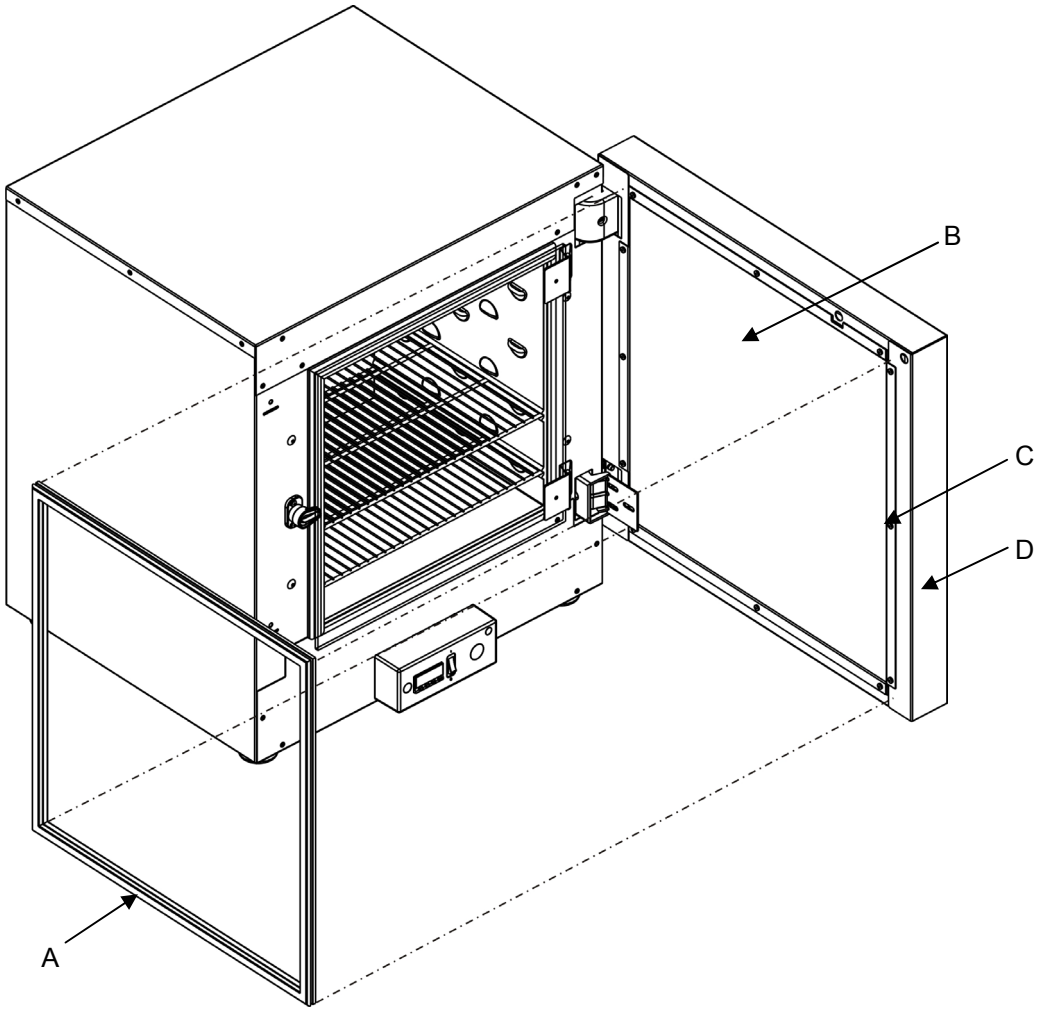


Figure 3: Replacing the outer door gasket

A	Outer door gasket	C	Screws
B	Door panel of the outer door	D	Outer door

4.4 Replacing the glass door gasket (RI)

Spare part	A3.6 (chap. 5)
Required Tools	---

1. Disconnect the incubator RI from the facility-side power supply.
2. Remove the old glass door gasket (A).
3. Position the new glass door gasket on the upper door gasket edges (1) + (2).
4. Press the glass door gasket down onto the horizontal top part of the gasket edge.
5. Position the glass door gasket on the lower right gasket edge (3).
6. Pull the glass door gasket down diagonally (4) until you can press the vertical and horizontal parts of the gasket onto all gasket edges.

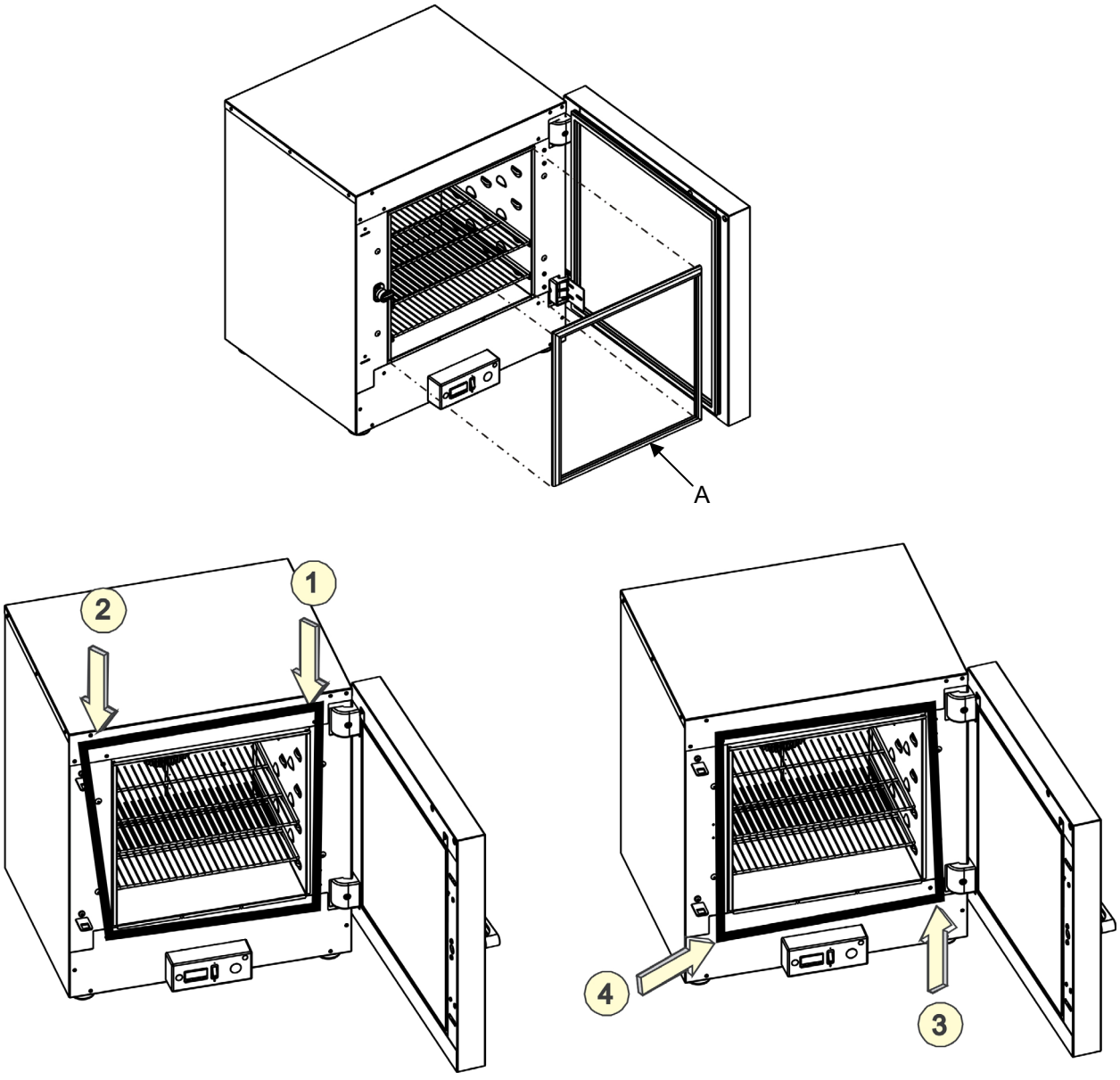


Figure 4: Replacing the glass door gasket (open glass door not shown)

A	Glass door gasket		

4.5 Replacing the glass door (RI)

Spare part	A3.3 to A3.5 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the incubator RI from the facility-side power supply.
2. Open the outer door (A) and the glass door (D).
3. Remove the screws (C) at the upper and then the lower glass door hinges (B).
4. Remove the glass door (D).
5. Mount the new glass door by following steps 1. to 4. in reverse order.

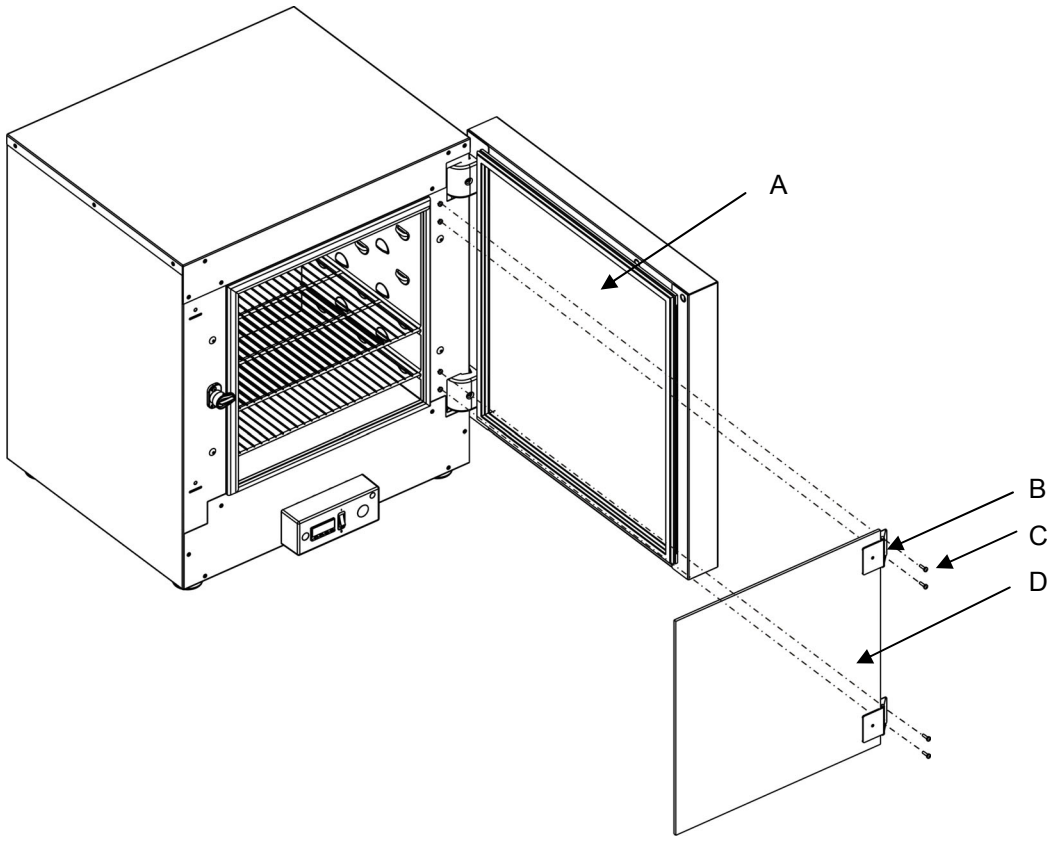


Figure 5: Replacing the glass door

A	Outer door	C	Screws
B	Glass door hinge	D	Glass door

4.6 Replacing the door handle (RE / RF)

Spare part	A2.1 to A2.5 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Open the door (A).
3. Remove the screw cover (B).
4. Remove the screw (C). This screw is secured with lacquer. Using to much force may destroy the screw head prior to loosening the screw.
5. Pull the door handle (D) out of the door.
6. Mount the door handle by following steps 1. to 5. in reverse order.

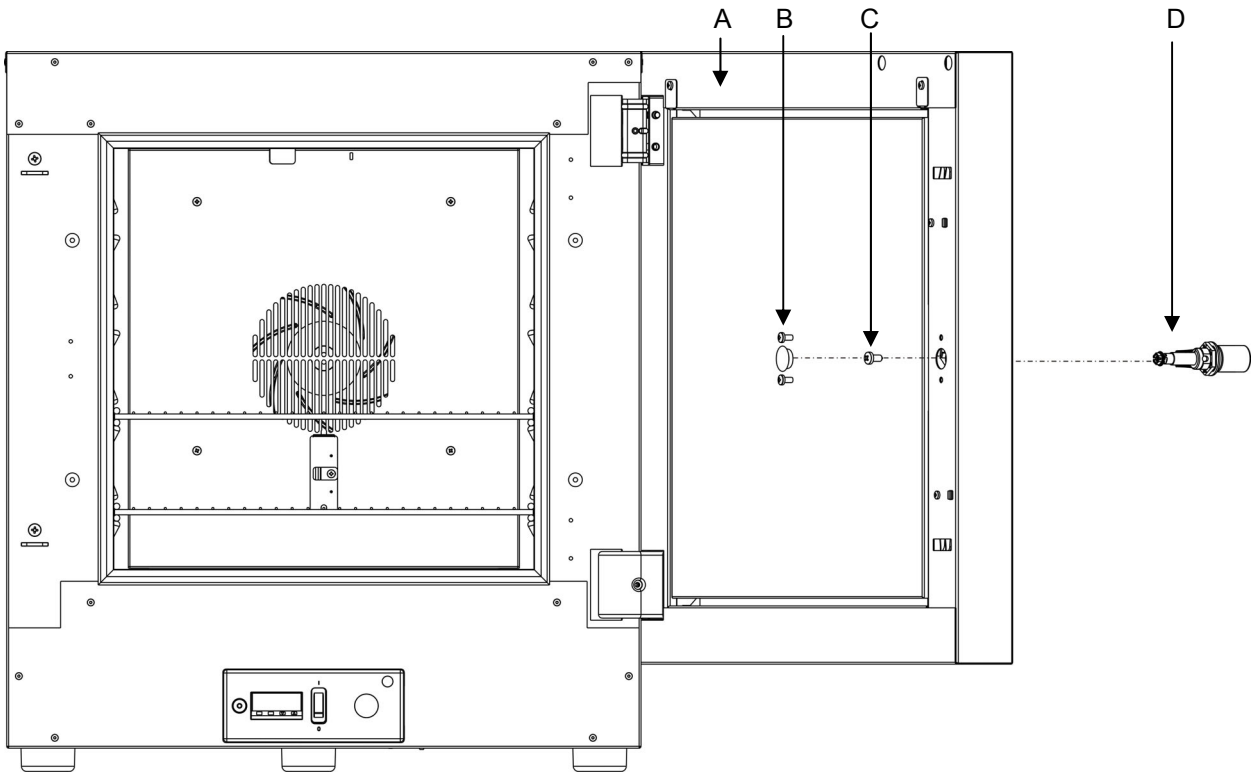


Figure 6: Replacing the door handle (example: RF)

A	Door	C	Screw
B	Screw cover	D	Door handle

4.7 Replacing the miniature fuse (RE / RF / RI)

Spare part	A9.2 (chap. 5)
Required Tools	---

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Open the fuse holder (A) by pulling it in the direction of the arrow.
3. Pull the fuse (B) out of the holder.
4. Check the fuse type: 5 x 20mm, 250V, 10Amp.
   230V units: middle time lag M, 100-120V units: time lag T
5. Insert the new fuse by following steps 1. to 3. in reverse order.

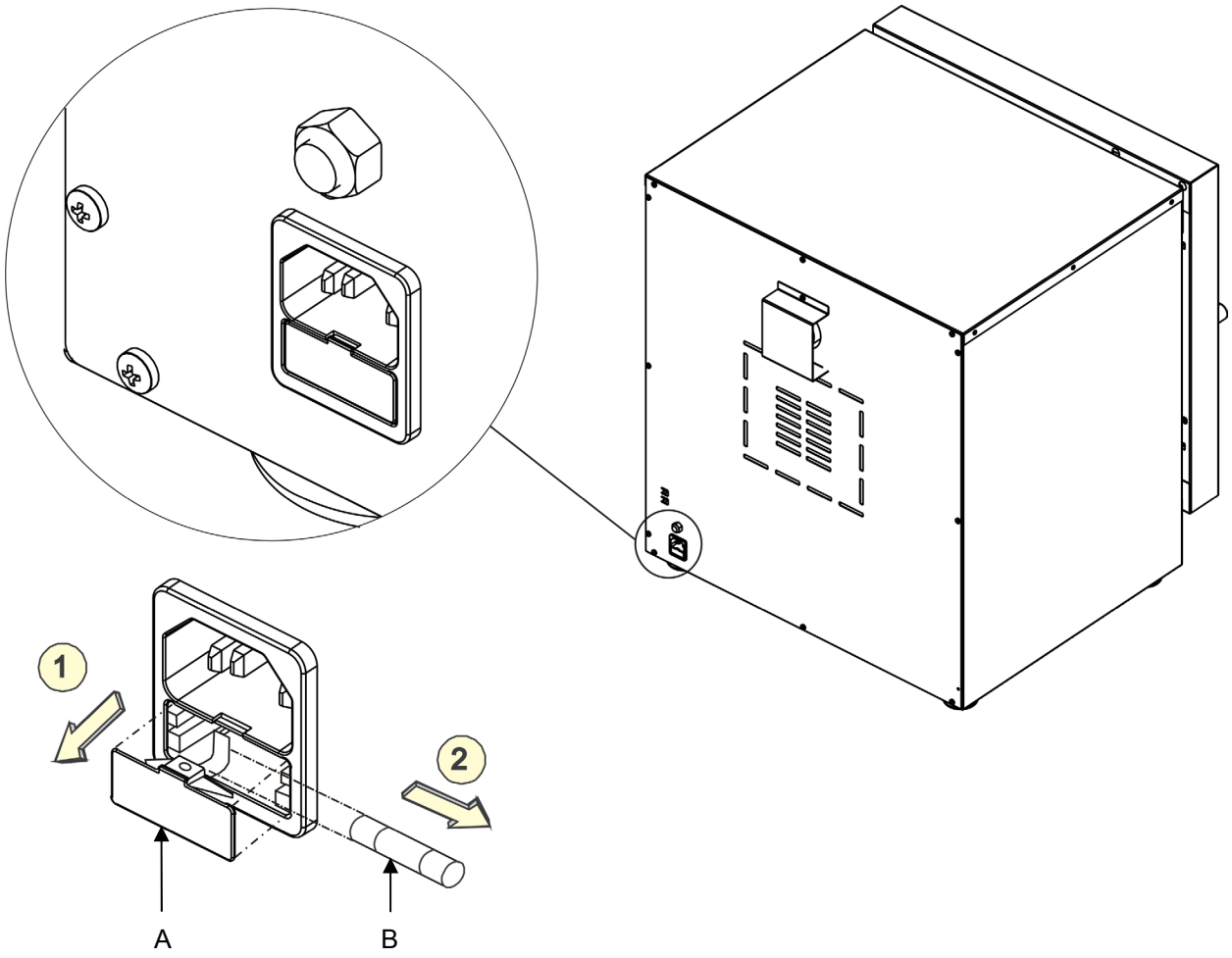


Figure 7: Replacing the miniature fuse

A	Fuse holder	B	Miniature fuse (-*X2*)

4.8 Replacing the controller board (RE / RF / RI)

Spare part	A1.1 to A1.3 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Compress the lateral clamps of the controller board (A) and pull out the controller board.
3. Insert the new controller.

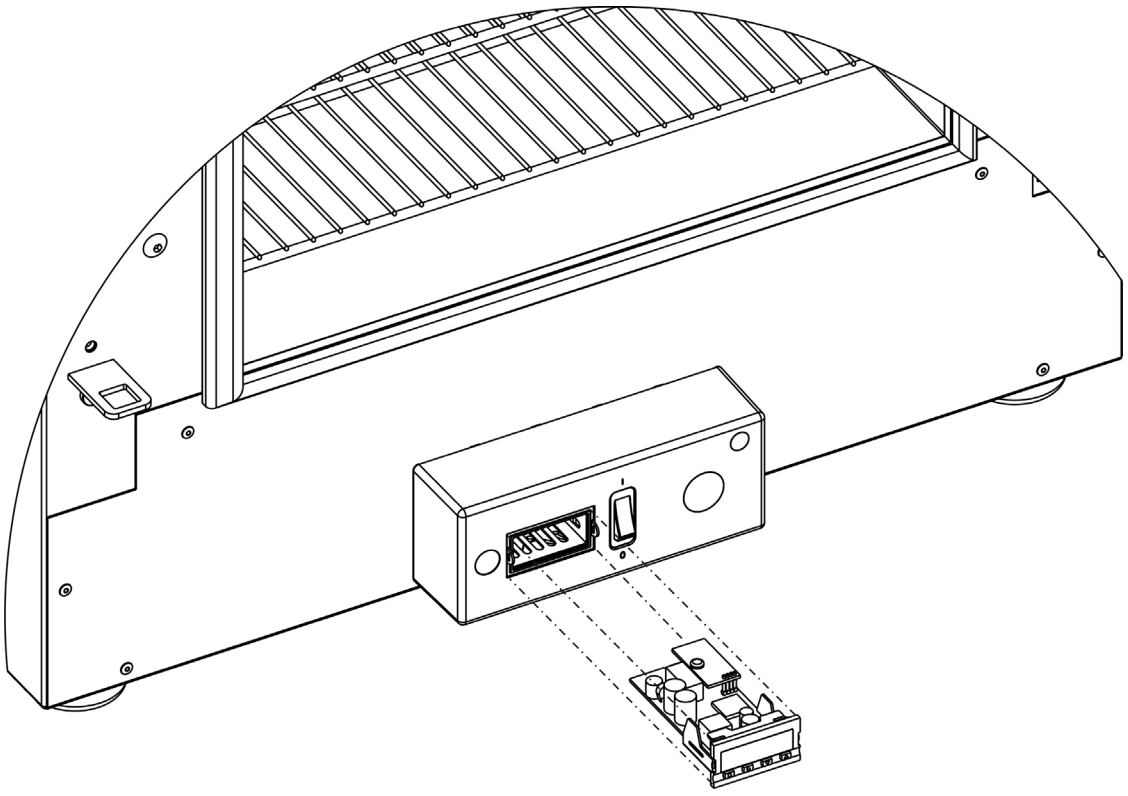


Figure 8: Replacing the controller board

A	Instrument panel	B	Controller board (*-2N1*)

4.9 Replacing the instrument panel and / or the complete controller (RE / RF / RI)

Spare part	A1.1 to A1.3 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove the screw (B) from the instrument panel.
3. Pull the instrument panel (A) forward to remove it.
4. Disconnect the main switch contacts (E). Do NOT separate the flat plug on the upper connector from the two-way flat plug. It is recommended to mark the cables. If you want to replace the instrument panel, remove the main switch (D) (chap. 4.10).

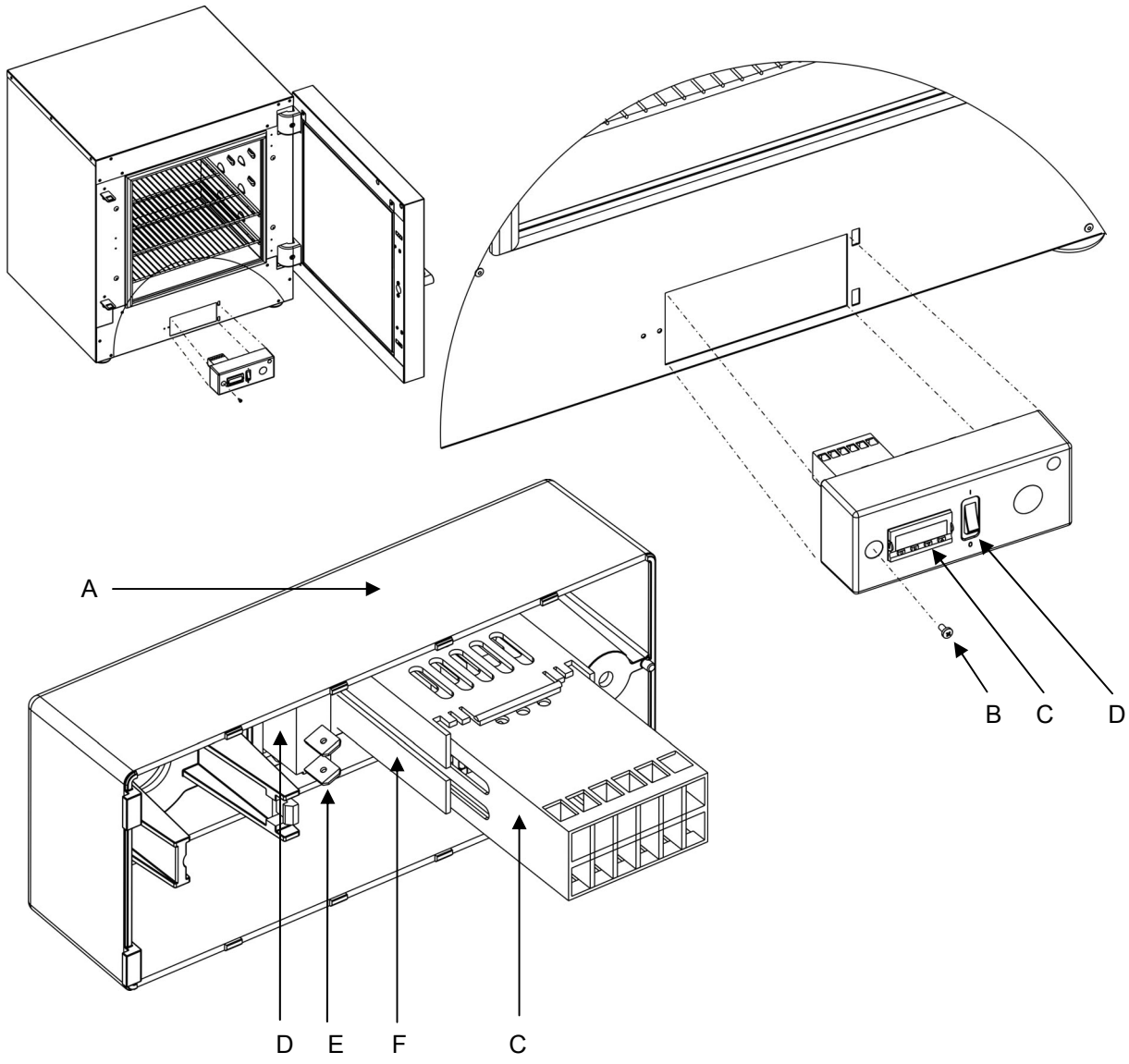


Figure 9: Dismounting the instrument panel

A	Instrument panel	D	Main switch (*-1S1*)
B	Screw of instrument panel	E	Main switch contacts (*-1S1*)
C	Controller	F	Controller fixings

5. Disconnect the controller board connectors for the solid-state ralay, the thermoelement, and the power supply.

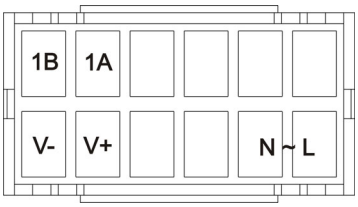


Figure 10: Connections of the controller (rear)

1B	1A	Solid-state ralay heating *(-2K1)*	N~ L	Power supply
V-	V+	Thermoelement *(-2B1)*		

6. Pull the controller fixings (F) off the controller.
7. Push the controller towards the front out of the instrument panel.
8. Replace the old instrument panel and/or install the new controller by following steps 1. to 7. in reverse order.

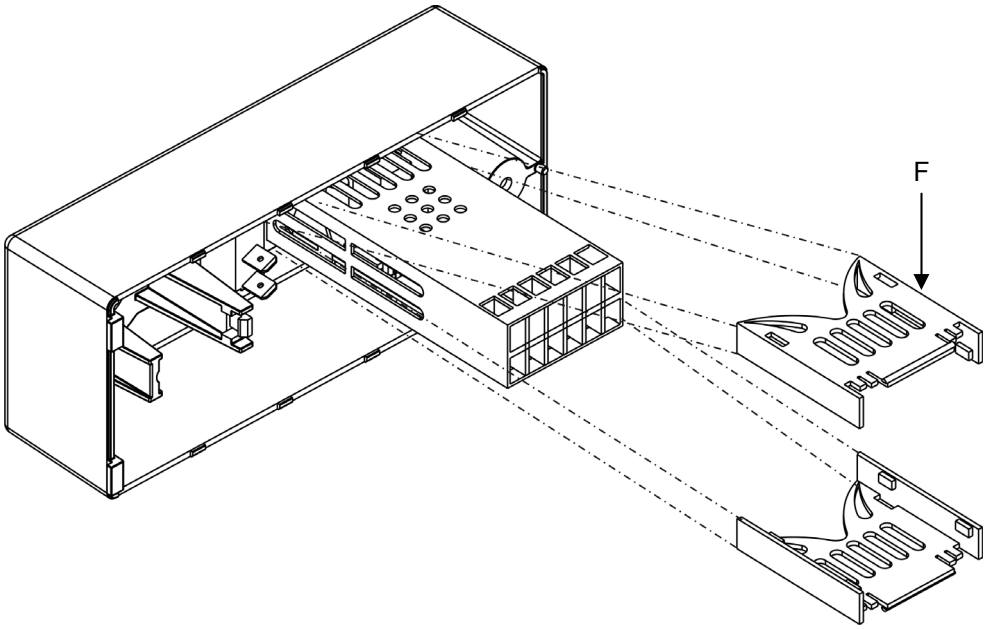


Figure 11: Pulling the controller fixings off the controller

4.10 Replacing the main switch (RE / RF / RI)

Spare parts	A1.4 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove the instrument panel as described in chap. 4.9.
3. Disconnect the main switch contacts. Do NOT separate the flat plug on the upper connector from the two-way flat plug. It is recommended to mark the cables.
4. Press the clamps (B) and push the main switch (A) downwards out of the instrument panel.
5. Mount the new main switch by following steps 1. to 4. in reverse order.

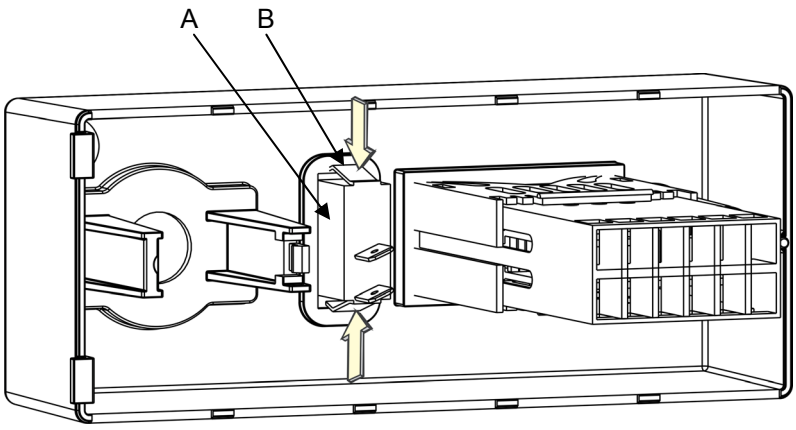


Figure 12: Replacing the main switch

A	Main switch (*-1S1*)	B	Clamps

4.11 Removing the rear panel (RE / RF / RI)

Spare parts	---
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove all screws (C). Size 53: 12 screws, size 115: 14 screws.
3. Remove the back panel (B).
4. Mount the rear panel by following steps 1. to 3. in reverse order.

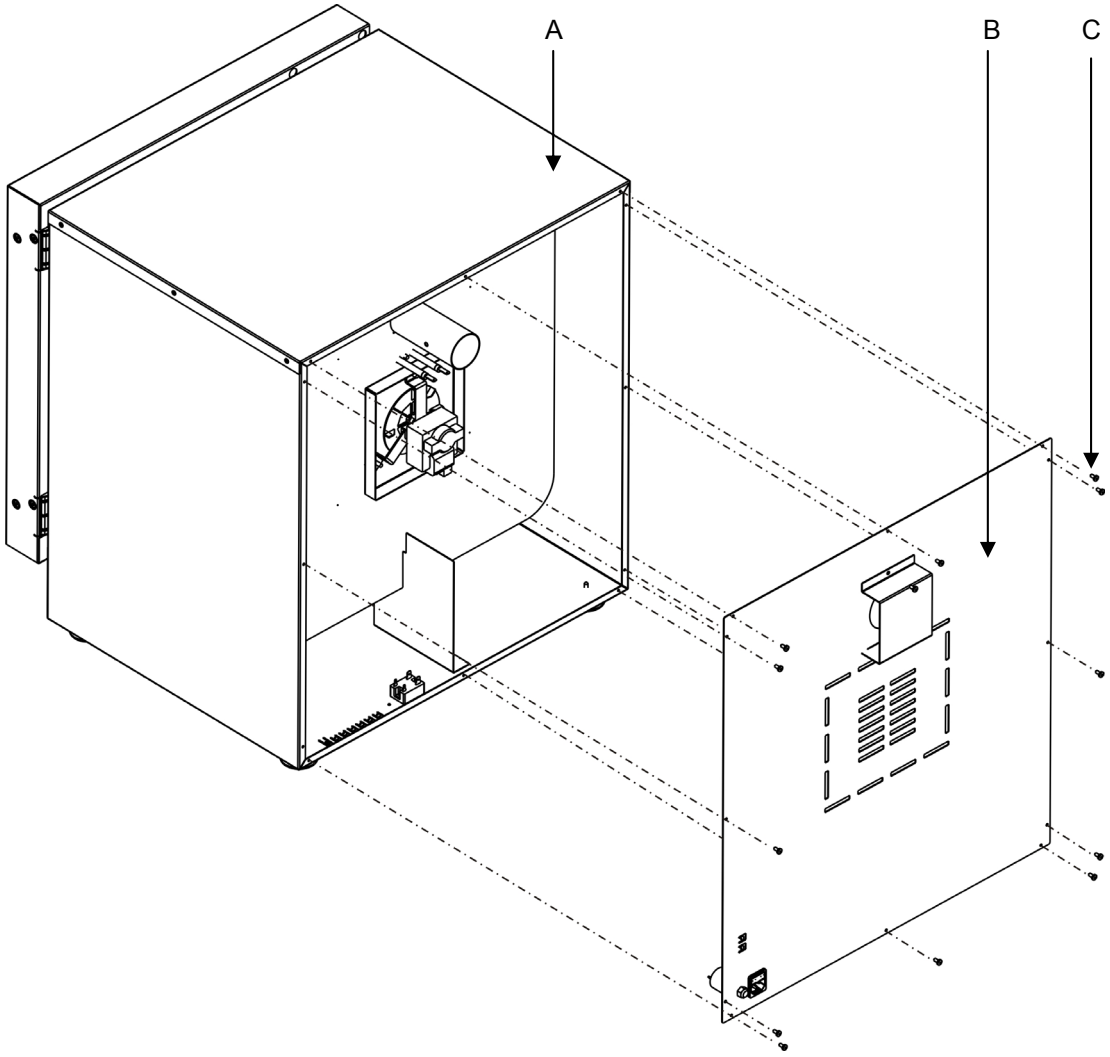


Figure 13: Removing the rear panel (example RF)

A	Unit housing	C	Screws
B	Rear panel		

4.12 Replacing the IEC connector plug (RE / RF / RI)

Spare parts	A9.1 to A9.2 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove the rear panel (A) (chap. 4.11).
3. Mark the cables connected to the IEC connector plug (B) with their positions.
4. Disconnect the cables from the IEC connector plug (B).
5. Push the IEC connector plug toward the front out of the rear panel (A).
6. Install a new IEC connector plug by following steps 1. to 5. in reverse order.

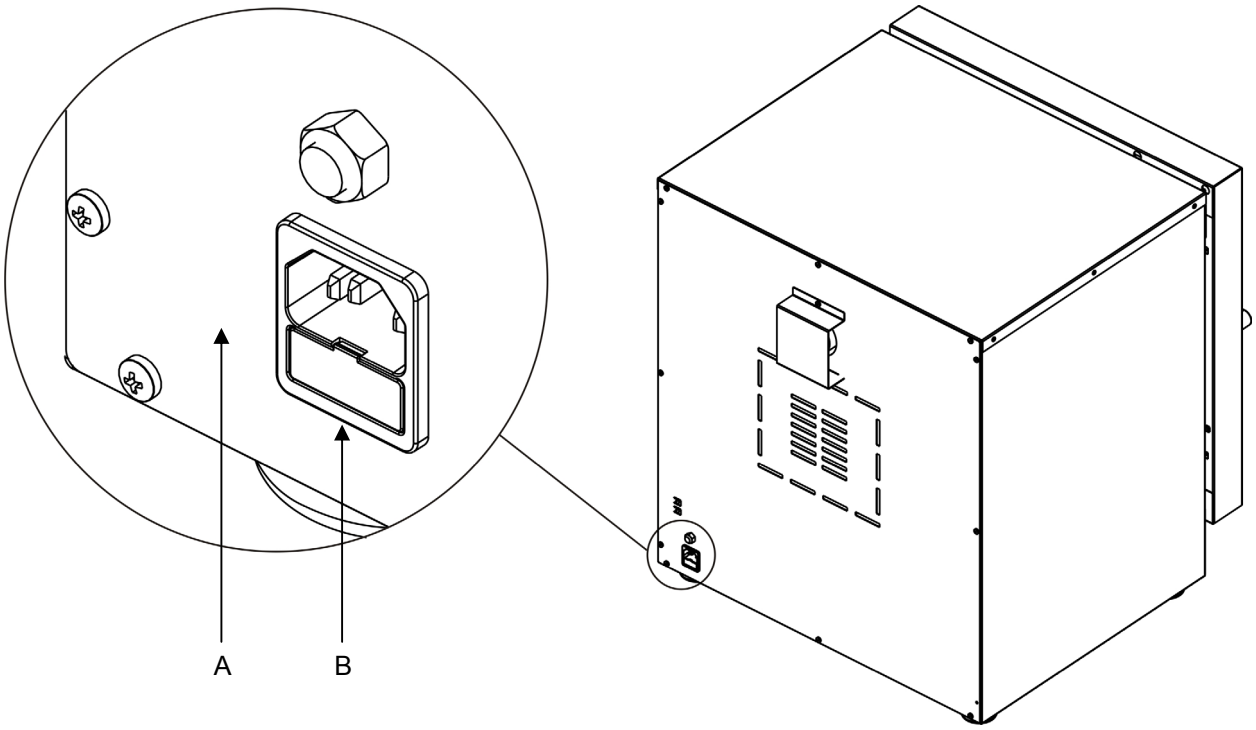


Figure 14: Replacing the IEC connector plug

A	Rear panel	B	IEC connector plug (-*X2*)

4.13 Replacing the solid state relay (RE / RF / RI)

Spare parts	A5.1 to A5.2 (chap. 5)
Required Tools	Crosstip screwdriver

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove the rear panel (chap. 4.11).
3. Mark the cables connected to the relay (B) with their positions at the relay.
4. Disconnect the cables from the connectors of the relay.
5. Remove both screws (A).
6. Remove the relay (B).
7. Install the new relay by following steps 1. to 6. in reverse order.

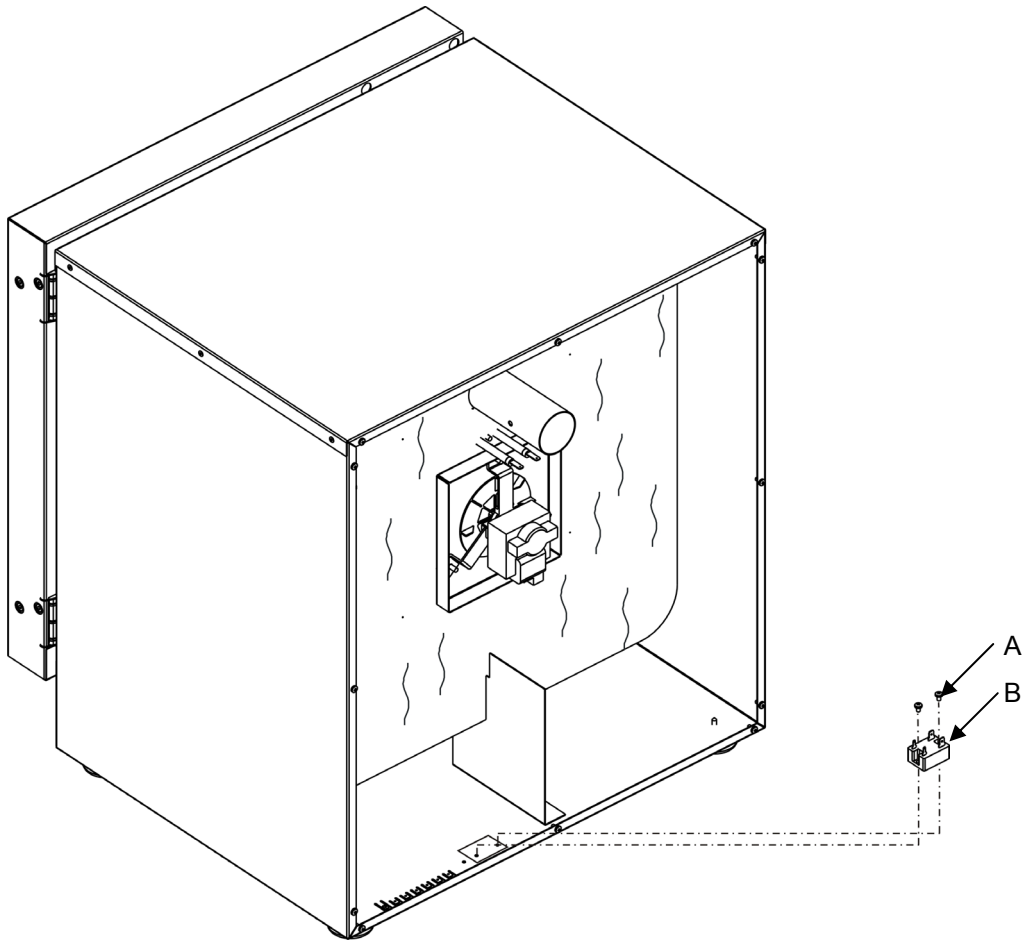


Figure 15: Replacing the solid state relay (example RF)

A	Screws	B	Relay (-*2K1*)

4.14 Replacing the temperature fuse (RE / RF / RI)

Spare parts	A7.1 to A7.2 (chap. 5) Aluminum scotch tape
Required Tools	Crosstip screwdriver Knife

1. Disconnect the redLINE chamber from the facility-side power supply.
2. Remove the rear panel (chap. 4.11).
3. Cut the rock wool with the knife at location (A).
4. Disconnect the cables from the connectors of the temperature fuse (B)
5. Remove both screws (D).
6. Remove the temperature fuse (B).
7. Install the new temperature fuse by following steps 1. to 6. in reverse order.
8. Seal the cut in the rock wool with aluminum scotch tape.

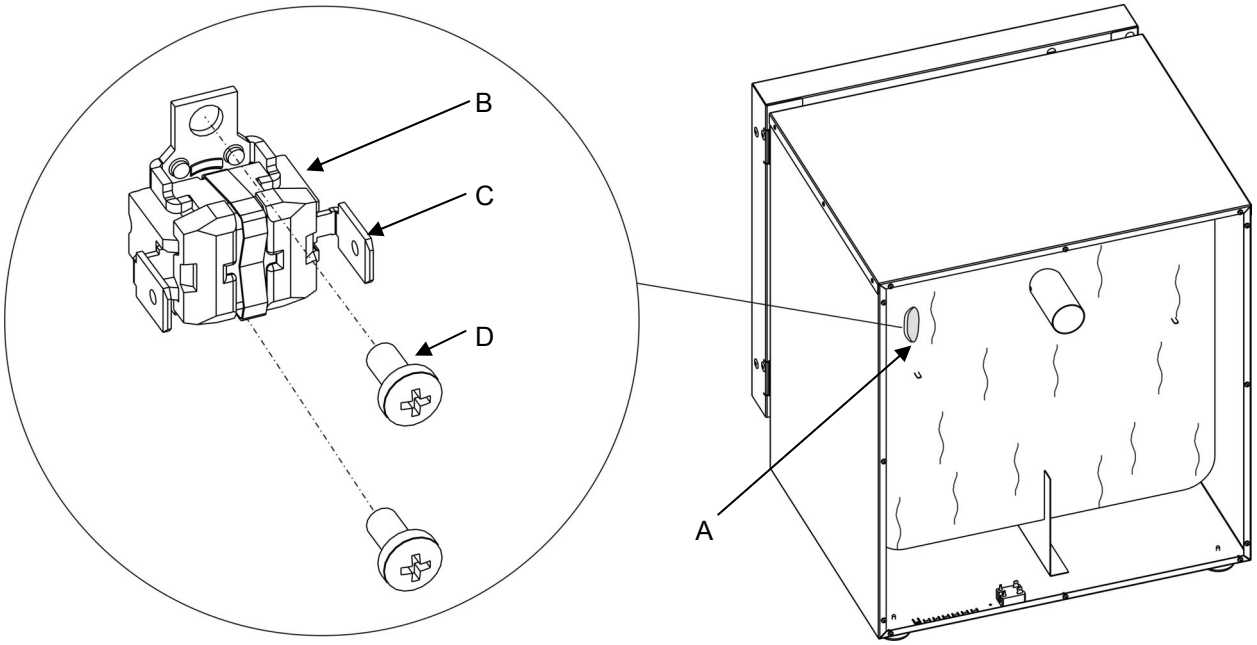


Figure 16: Replacing the temperature fuse (example RE)

A	Location of temperature fuse	C	Connector
B	Temperature fuse (-*1F2*)	D	Screws

4.15 Replacing the fan (RF)

Spare parts	A6.1 to A6.4 (chap. 5)
Required Tools	Crosstip screwdriver Wrench for 10 mm nuts (M5)

1. Disconnect the drying oven RF from the facility-side power supply.
2. Remove the screw (D) of the thermoelement cover (C).
3. Remove the cover (C) and the fixing panel (E) of the thermoelement.
4. Remove the screws (B) of the rear panel (A) of the inner chamber.
5. Pull the rear panel (A) out of the chamber.
6. Keep hold of the fan wheel (H) and unscrew the cap nut (J) by turning it clockwise with the wrench.

	The cap nut has a left-handed thread and will be unscrewed by turning it clockwise to the right.

7. Remove the following parts from the fan drive shaft one after the other:

   Driving sheet (I),

   Fan wheel (H),

   Shim ring (G),

   Circlip (F) (The circlip is placed in a groove of the fan drive shaft)
8. Remove the rear panel (chap. 4.11).
9. Disconnect the two power supply cables and the ground cable from the connectors of the fan motor (N).
10. Remove the three nuts (O).
11. Pull the fan motor (N) with its drive shaft out of the inner chamber.
12. Remove the fan wheel (M).
13. Install the new fan by following steps 1. to 11. in reverse order. The two power supply cables can be connected in any order.

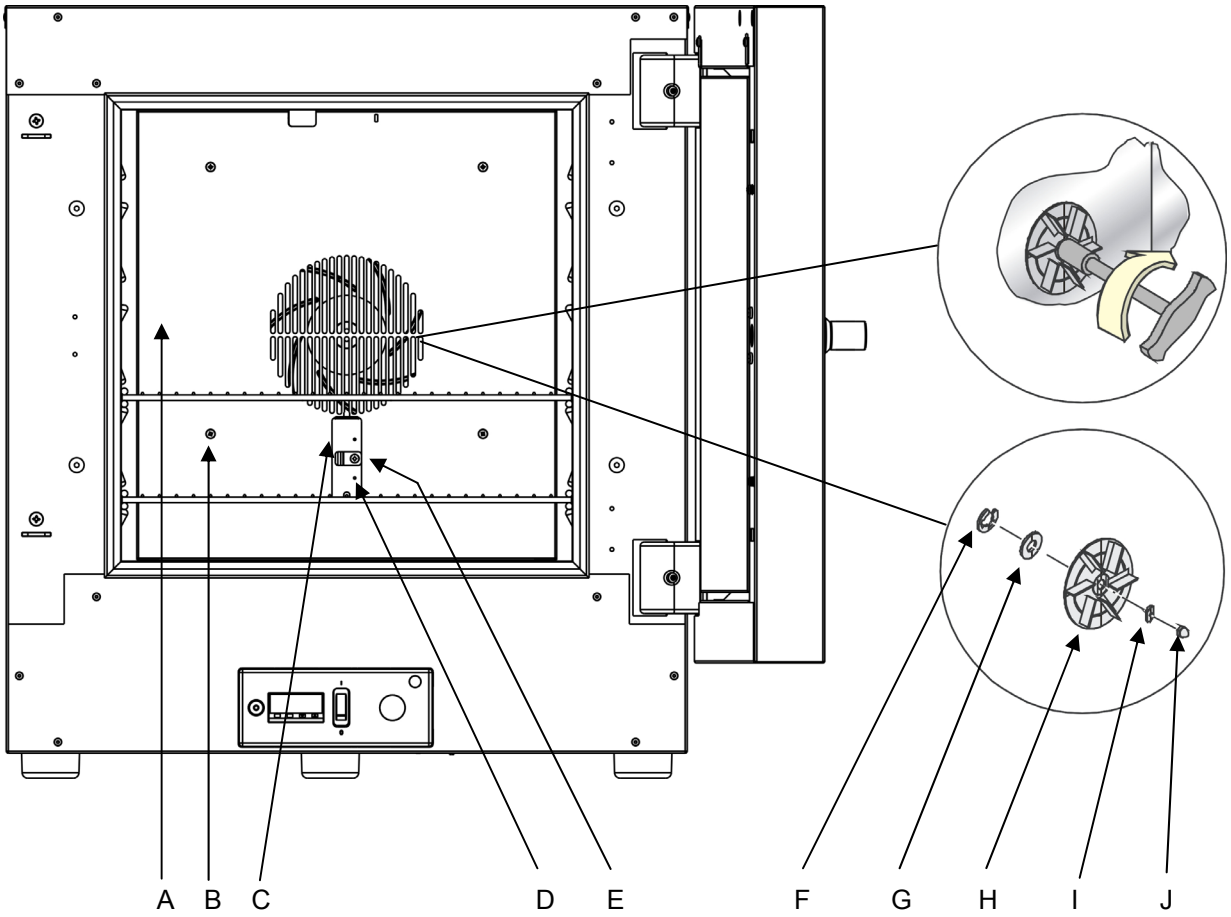


Figure 17: Replacing the fan RF (part 1)

A	Rear panel of inner chamber	F	Circlip
B	Screws of rear panel	G	Shim ring
C	Thermoelement cover	H	Fan wheel
D	Screw of of the thermoelement cover	I	Driving sheet
E	Fixing panel of the thermoelement	J	Cap nut

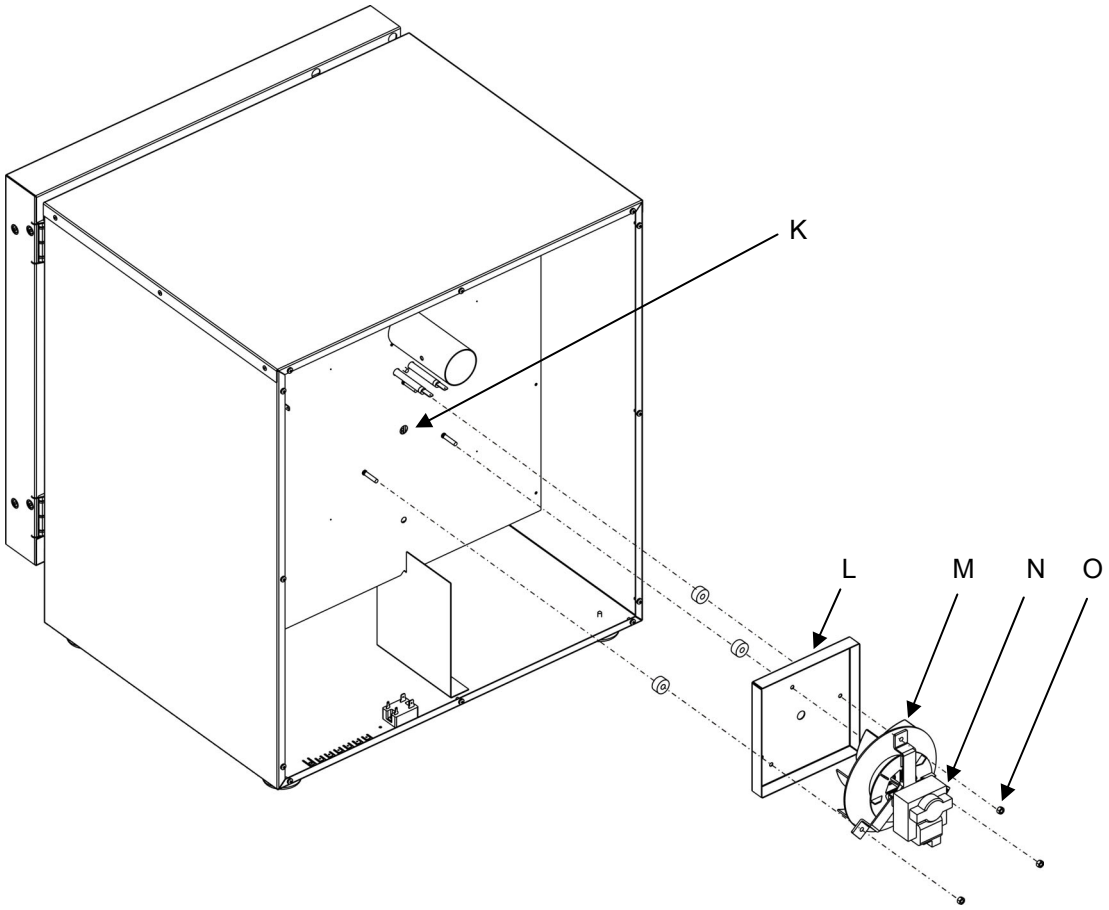


Figure 18: Replacing the fan RF (part 2)

K	Duct for fan drive shaft	N	Fan motor
L	Fan panel	O	Nuts
M	Fan wheel		

4.16 Checking and replacing the thermoelement (RE / RF / RI)

Spare parts	A8.1 to A8.5 (chap. 5) Aluminum scotch tape
Required Tools	Crosstip screwdriver Voltage measuring device (volt meter) Reference temperature measuring device

DANGER

Open primary voltage.

Danger of electric shock.

Danger of death.

➢ Take all precautionary measures not to get in contact with live components of the unit.

1. Place a sensor of the temperature reference instrument alongside the thermoelement of the redLINE chamber.
2. Let the chamber equilibrate to the desired temperature.
3. Unscrew the instrument panel (chap. 4.9). Do not disconnect the thermoelement wires V- and V+ from the controller, connect them to the volt meter. If the controller display does not change, the internal resistance of the volt meter is large enough to not affect the measuring result when measuring parallely to the controller. If the controller display changes, disconnect the thermoelement wires V- and V+ from the controller and then connect them to the volt meter.
4. Measure the ambient temperature at the location of the connection betrween thermoelement and volt meter.
5. Compare measured voltage value to the voltage value calculated from the table at the end of this chapter and assess whether it is situated inside the indicated tolerance range. If not, the thermoelement is defective and must be replaced. If no replacement is required, follow steps 1. to 3. in reverse order.
6. Remove the rear panel (chap. 4.11).
7. Cut the rock wool with the knife at the point (A) where the thermoelement (B) is placed.
8. Pull the thermoelement (B) through the duct (A) out of the inner chamber.
9. Cut all lacings cords which attach the thermoelement cable (B) to other cables.
10. Pull the thermoelement cable (B) carefully out of the unit from the rear.
11. Introduce the new thermoelement with its cable from the front through the hinge until you can take it from the rear.
12. Mount the new thermoelement by following steps 1. to 10. in reverse order.
13. Seal the cut in the rock wool with aluminum scotch tape.
14. Calibrate and adjust the controller (see description in the operating manual).

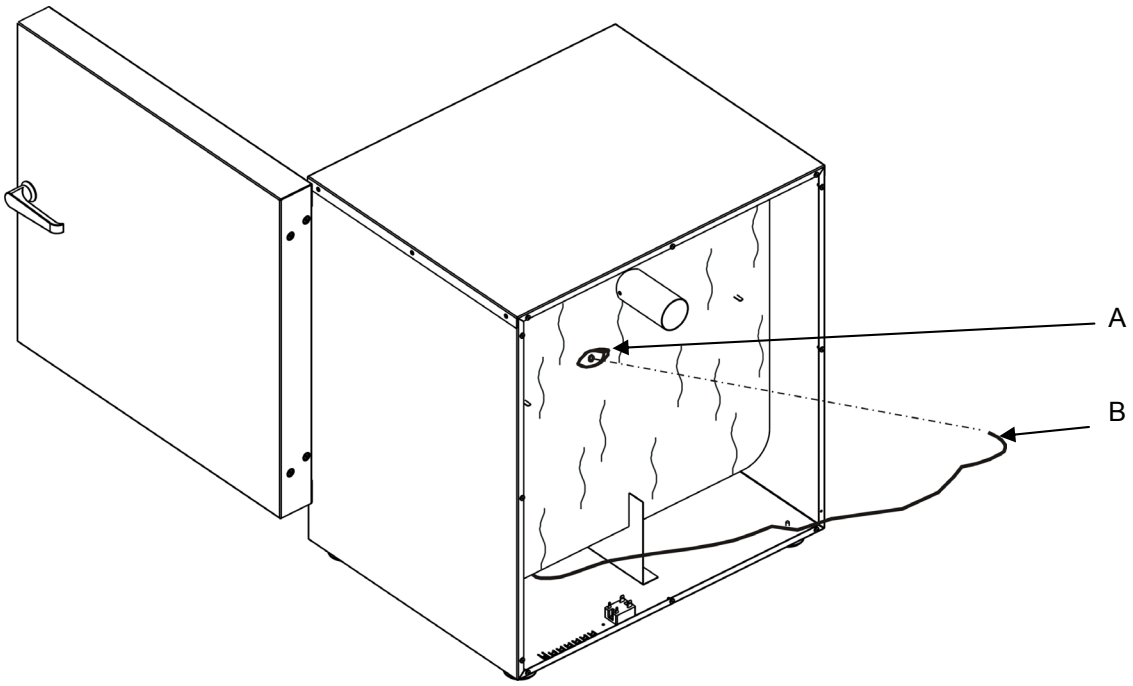


Figure 19: Replacing the thermoelement (example RE)

A	Thermoelement duct	B	Thermoelement (*-2B1*)

The following table gives the voltage values of the thermoelement, referring to a cold junction temperature of 0°C / *32°F*.

Table 1: Voltage and temperature values of thermoelement type K

Temperature as given by the reference measuring device [°C] / *[°F]*	Voltage for thermoelement type K [µV]		Temperature as given by the reference measuring device [°C]	Voltage for thermoelement type K [µV]
0 / *32*	0		120 / *248*	4919
10 / *50*	397		130 / *266*	5327
20 / *68*	798		140 / *284*	5733
30 / *86*	1203		150 / *302*	6137
40 / *104*	1611		160 / *320*	6539
50 / *122*	2022		170 / *338*	6939
60 / *140*	2436		180 / *356*	7338
70 / *158*	2850		190 / *374*	7737
80 / *176*	3266		200 / *392*	8137
90 / *194*	3681		210 / *410*	8537
100 / *212*	4095		220 / *428*	8938
110 / *230*	4549		230 / *446*	9341

Calculation of the valtage value and comparison to the measured value

$U_{measure}$: voltage to be measured

$T_{chamber}$: temperature set at the chamber

$T_{ambient}$: ambient temperature at the location of the connection betrween thermoelement and volt meter, i.e. the temperature of the contacts at the measuring device or at the ends of the edges of the measuring device which contact the wirings of the thermoelement.

The voltage $U_{measure}$ corresponding to the set temperature value can be calculated from the voltage values given in Table 1for both temperature values:

$U_{measure} = U (T_{chamber}) - U (T_{ambient})$

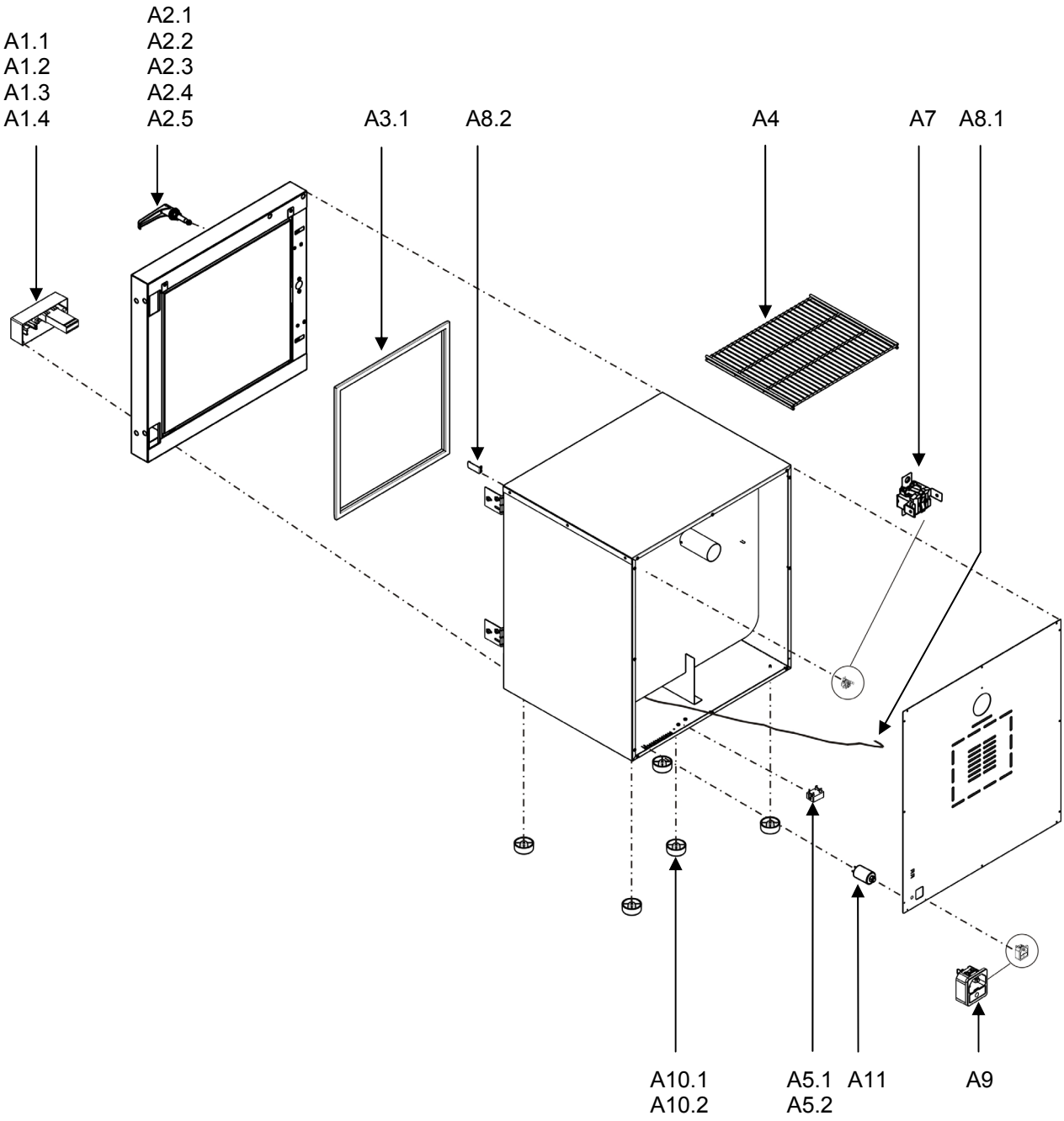
The measured voltage value should correspond to the calculated value within a tolerance range of 100µV (corresponding to 2,5K). To this tolerance the inexactitude of thew temperature reference measuring device (recommended: max. 2 degrees corresponding to approx. 80 µV) and the inexactitude of the employed volt meter (recommended: max. 100µV) will be added. Measuring the voltage with a multimeter parallely to the controller may lead to wrong results because the internal resistance of a measuring device is not infinetely large.

Remark: This is a rough test meant to decide whether to replace the thermoelement or not. If you note a deviation from the value calculated from Table 1 which is less than 100µV, this may be due to the incertitude of the measuring equipment. In order to be sure that there is no deviation, you can calibrate the controller (see description in the user manual).

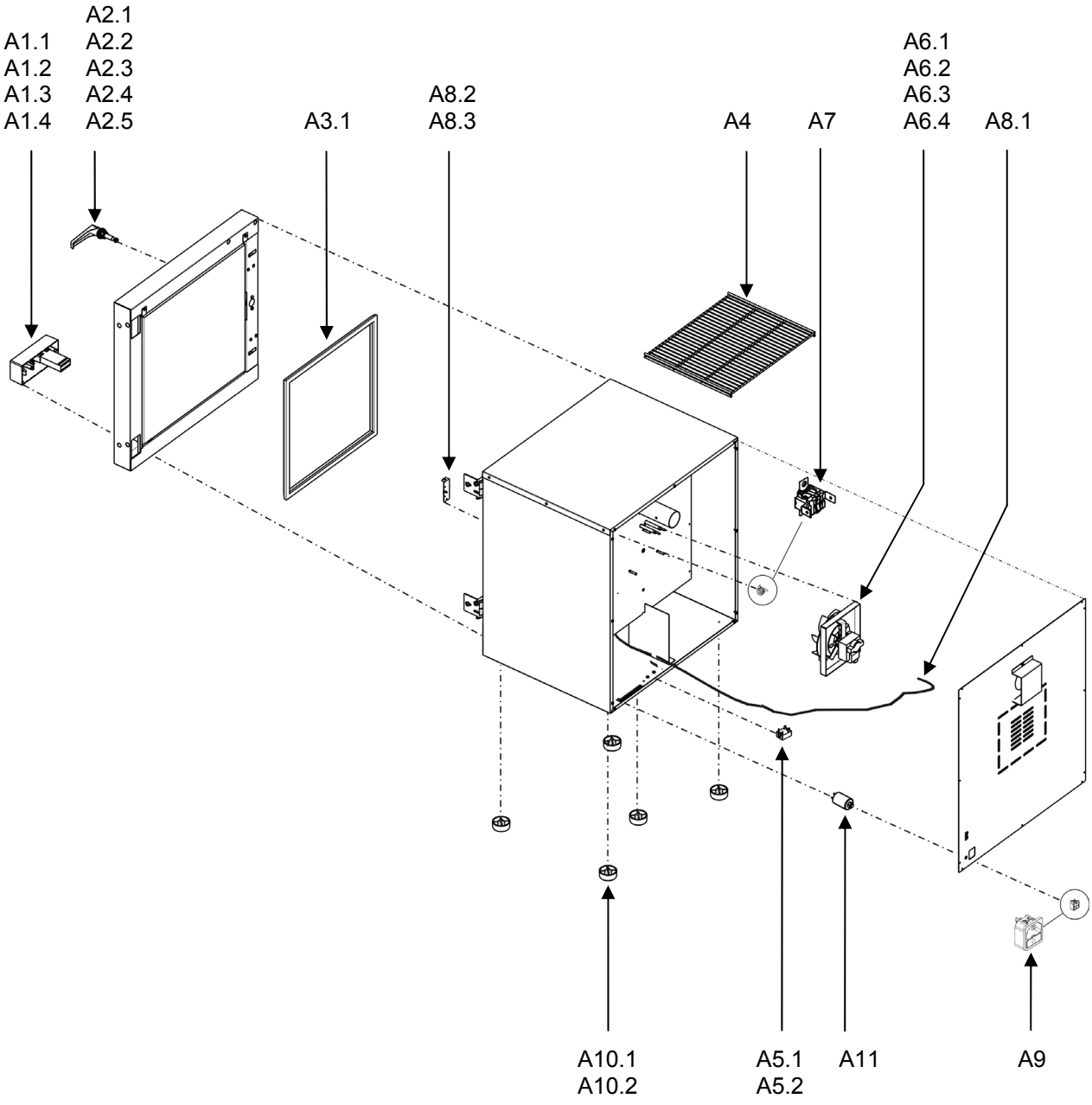
5. Spare parts

	The manufacturer is only responsible for the safety features of the unit provided skilled electricians or qualified personnel authorized by the manufacturer perform all maintenance and repair, and if components relating to chamber safety are replaced in the event of failure with original spare parts. The user is responsible for any risk arising from using unauthorized accessories.

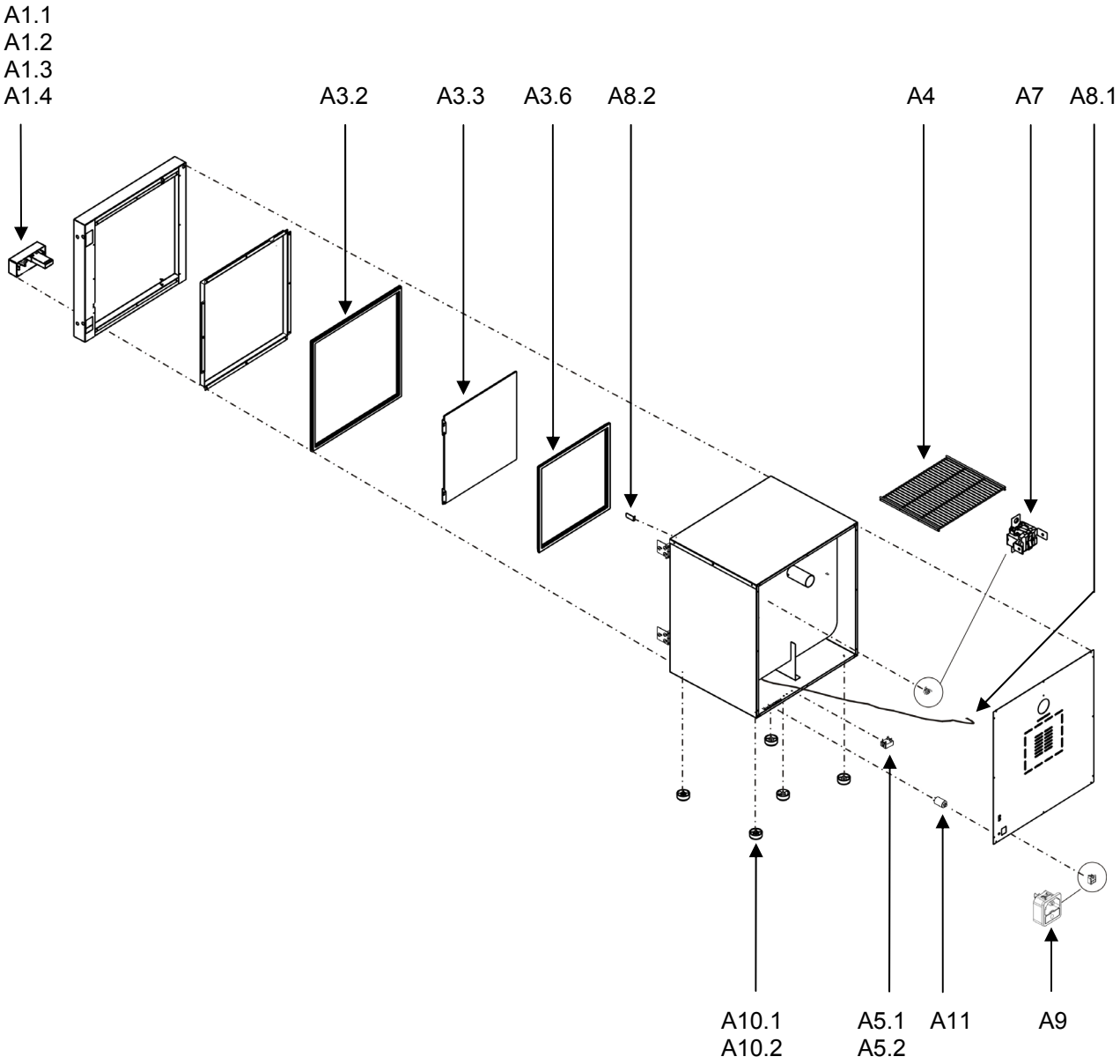
5.1 Overview RE



5.2 Overview RF



5.3 Overview RI



No.	Description	Electrical component no.	Quantity	Order no.
A1 Instrument panel and controller				
A1.1	Instrument panel Redline		1	6002-0416
A1.2	Screw 3,9 x 9,5		1	3001-0003
A1.3	Controller complete	*-2N1*	1	5014-0139
A1.4	Main switch	*-1S1*	1	5019-0019
A2 Door handle				
A2.1	Door handle complete (RE + RF)		1	6002-0402
A2.2	O-ring (RE + RF)		1	(included)
A2.3	Plain washer (RE + RF)		1	(included)
A2.4	Screw M6 x 40		1	(included)
A2.5	Screw cover		1	6002-0023
A3 Doors and door gaskets				
A3.1	Door gasket (RE 53 + RF 53)		1	6005-0135
A3.1	Door gasket (RE 115 + RF 115)		1	6005-0144
A3.2	Outer door gasket (RI 53)		1	6005-0184
A3.2	Outer door gasket (RI 115)		1	6005-0191
A3.3	Glass door with lock and door hinges (RI 53)		1	8010-0082
A3.3	Glass door with lock and door hinges (RI 115)		1	8010-0084
A3.4	Glass door holder (RI)		1	6002-0365
A3.5	Glass door handle (RI)		1	6002-0366
A3.6	Glass door gasket (RI 53)		1	6005-0118
A3.6	Glass door gasket (RI 115)		1	6005-0143
A4 Trays				
A4	Tray (RE 53 + RF 53 + RI 53)		2	6004-0077
A4	Tray (RE 115 + RF 115 + RI 115)		2	6004-0079
A5 Solid state relay				
A5.1	Solid state relay	*-2K1*	1	5011-0060
A5.2	Screw 3.9 x 6.5		2	3001-0168
A6 Fan				
A6.1	Radial fan 40W, 230V, 50Hz (RF) (230V units)	*-1M1*	1	5013-0021
A6.1	Radial fan 70W, 115V, 60Hz (RF) (UL units)	*-1M1*	1	5013-0047
A6.2	Spacer for fan (RF)		3	6003-0039
A6.3	Toothed disc (RF)		3	3003-0032
A6.4	Nut M5 (RF)		3	3002-0006

No.	Description	Electrical component no.	Quantity	Order no.
A7 Temperature fuse				
A7.1	Temperature fuse 229°C (RE, RF)	*-1F2*	1	5006-0037
A7.1	Temperature fuse 110°C (RI)	*-1F2*	1	5006-0043
A7.2	Screw 3.9 x 9.5 A2		2	3001-0015
A8 Temperature measurement				
A8.1	Thermoelement	*-2B1*	1	5002-0061
A8.2	Thermoelement holder (RE, RI)		1	6006-0016
A8.2	Thermoelement holder (RF)		1	4020-0026
A8.3	Additional holding panel for thermoelement (RF)		1	4020-0717
A8.4	Screw M4 x 6 A2		1	3001-0004
A8.5	Toothed disc for M4		1	3003-0002
A9 Power connection and unit fuse				
A9.1	IEC connector plug with fuse holder 10A	*-X1*	1	5024-0205
A9.2	Miniature fuse 10 Amp medium time lag (230V units)	*-X1*	1	5006-0012
A9.2	Miniature fuse 10 Amp time lag (UL units)	*-X1*	1	5006-0079
A9.3	Connection cable with EU plug (230V units)	*-W1*	1	5023-0174
A9.3	Connection cable with plug NEMA 5-15P (for UL units)	*-W1*	1	5023-0175
A9.3	Connection cable with plug for England	*-W1*	1	5023-0182
A9.3	Connection cable with plug for Switzerland	*-W1*	1	5023-0183
A10 Unit foot				
A10.1	Unit foot		Size 53: 4 Size 115: 5	6002-0006
A10.2	Screw 3.9 x 9.5		5	3001-0003
A11 Interference capacitor				
A11	Interference capacitor 230V AC (230V units)	*-1Z1*	1	5026-0001

6. Wiring diagrams

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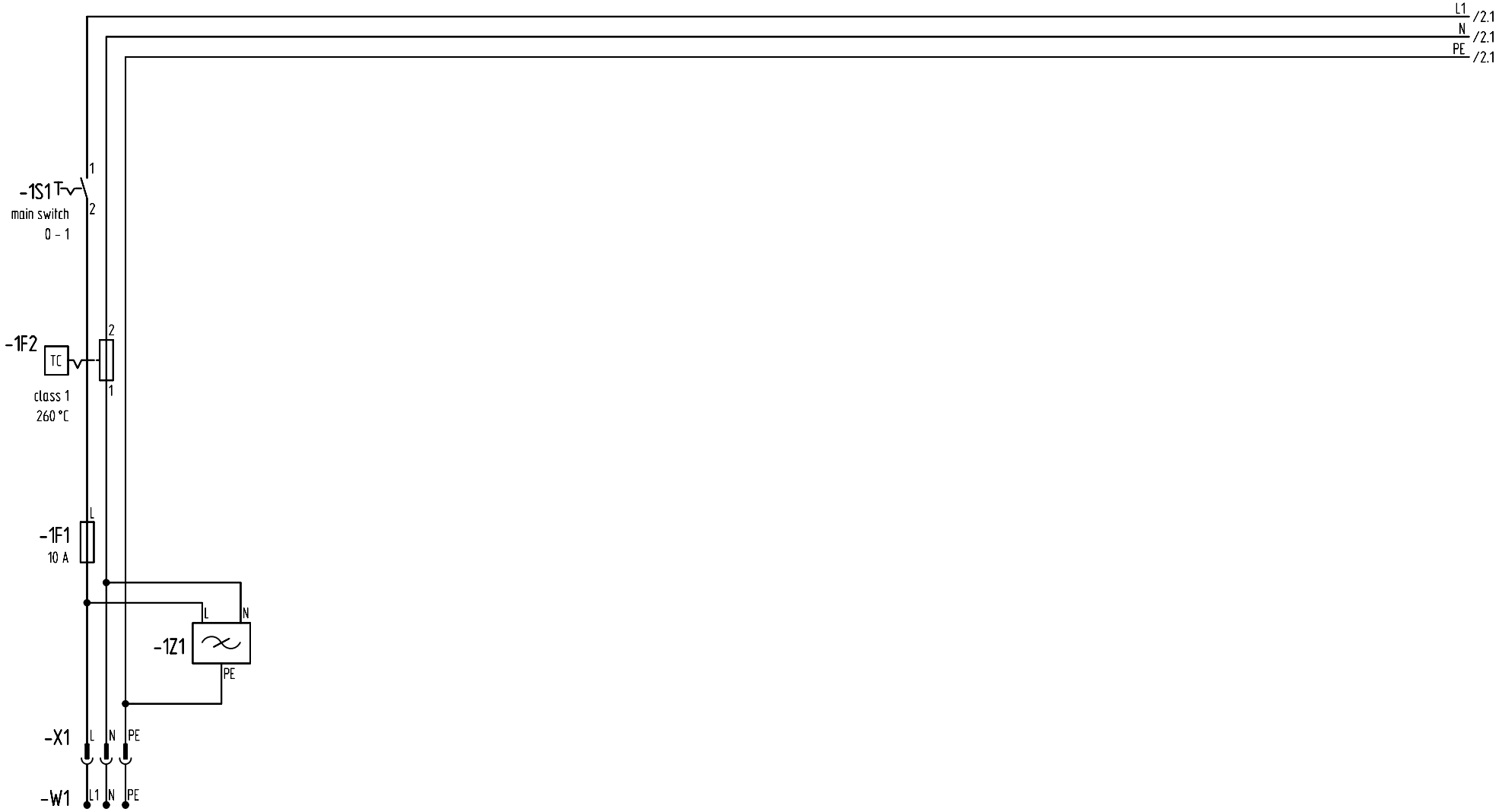

power-supply
230V/50Hz
1/N/PE

technical data
P= 0,80 kW
U= 230 V / 50 Hz
I= 3,5 A

	thermal fuse 260°C			date	03.02.2010	WIRING STANDARD RE 53 (220°C)	redLINE by BINDER	power-supply	model RE 53	=
B	start W1008	02.03.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0001	file 56781002.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 1 from 2 pg.

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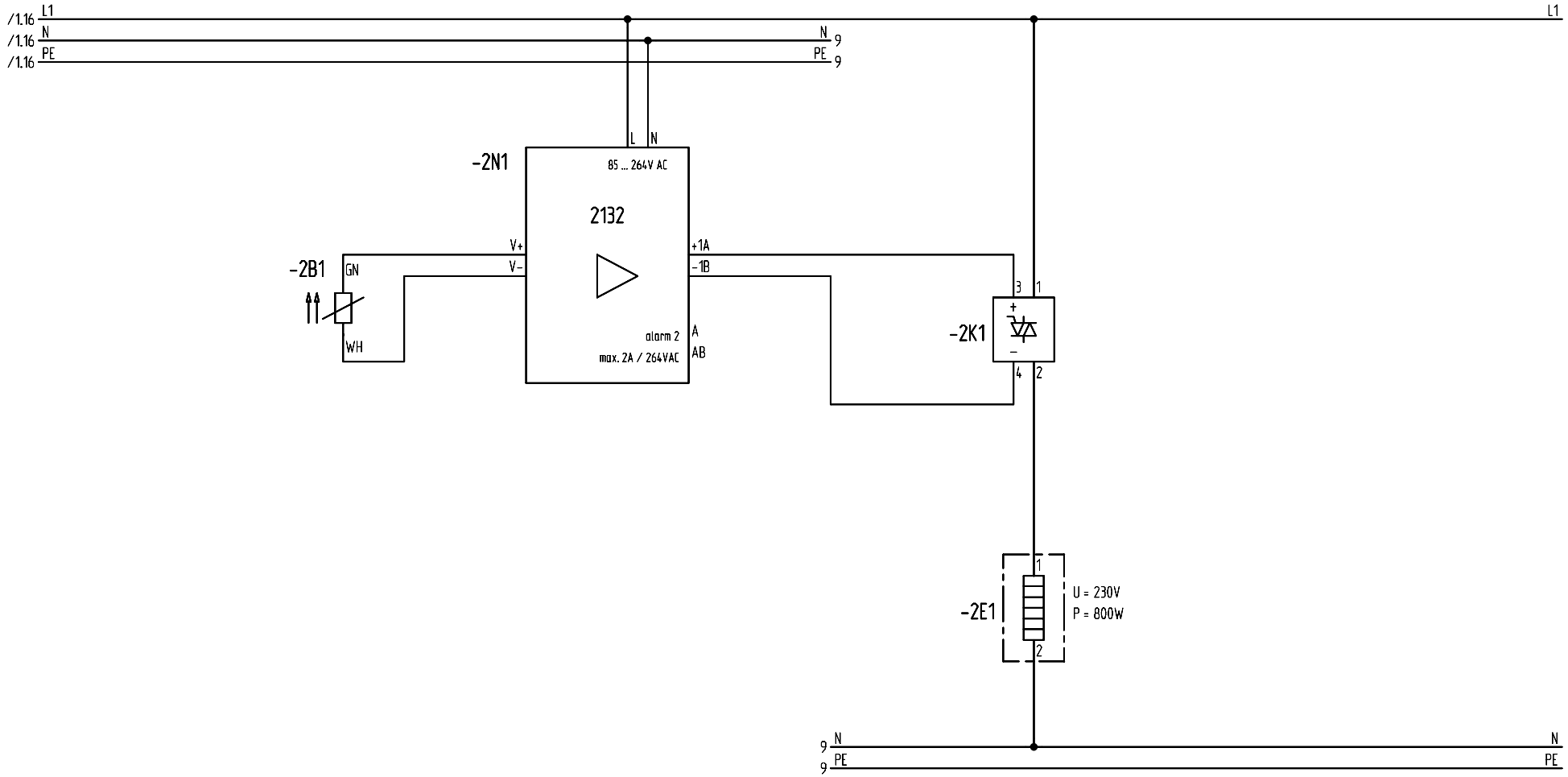

control temperature

heating

	thermal fuse 260°C			date	03.02.2010	WIRING STANDARD RE 53 (220°C)	redLINE by BINDER	control system heating	model RE 53	=	
B	start W1008	02.03.2010	SME	edited	SME					+	
				tested	RME				art.-No. 9090-0001	file 56781002.PRO	page 2
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram			from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	mains cable 230VAC/10A	5023-0174	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Medium-Time-Lag M	5006-0012	1.2
5	-1Z1	capacitor 1-phase 230VAC	5026-0001	1.3
6	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
7	-2N1	controller 2132	5014-0139	2.7
8	-2E1	heating 230V / 800W	5005-0143	2.11
9	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name
	thermal fuse 260°C		
B	start W1008	02.03.2010	SME

date	03.02.2010
edited	SME
tested	RME
norm	

WIRING STANDARD
RE 53 (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RE 53 | = | +

art.-No.: 9090-0001 | file: 56781002.PRO | page 1 | from 1 pg.

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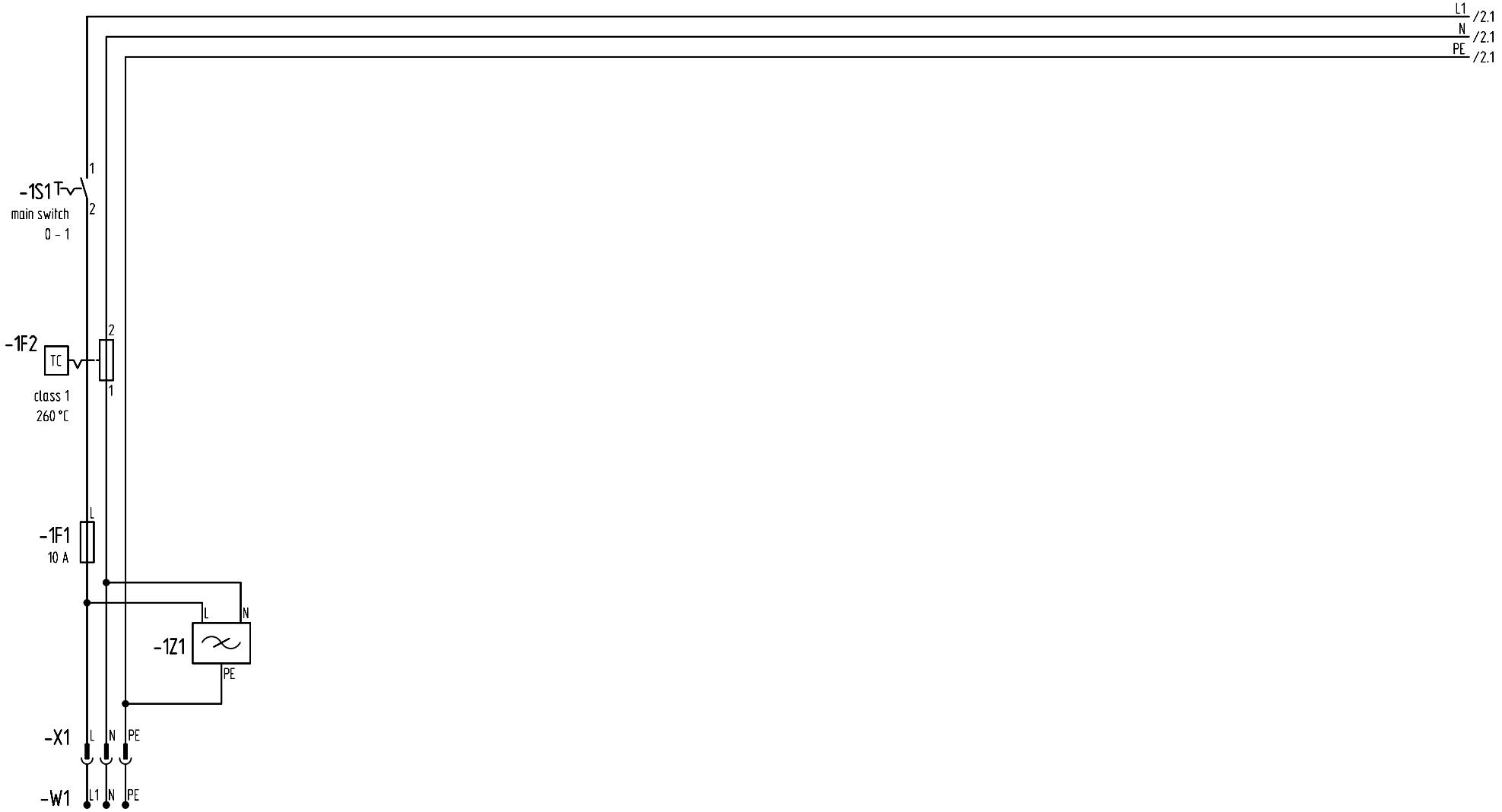

power-supply
230V/50Hz
1/N/PE

technical data
P= 1,00 kW
U= 230 V / 50 Hz
I= 4,4 A

state	change	date	name		
	thermal fuse 260°C			date	03.02.2010
B	start W1009	05.03.2010	SME	edited	SME
				tested	RME
				norm	

WIRING STANDARD
RE 115 (220°C)

origin | substitude for | replaced by

redLINE by BINDER

power-supply
wiring diagram

model: RE 115
art.-No.: 9090-0007
file: 56791002.PRO

=
+

page 1
from 2 pg.

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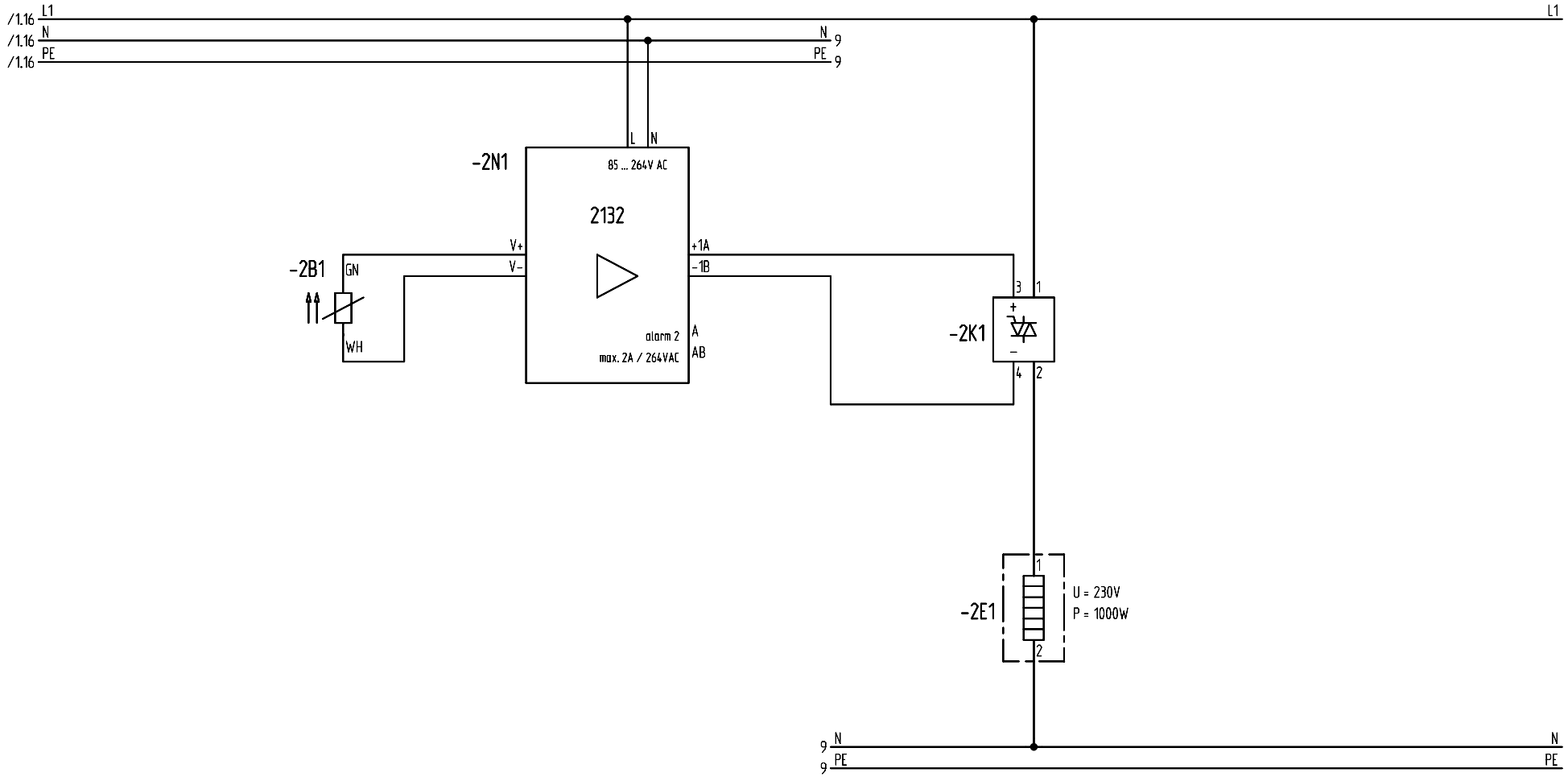

	thermal fuse 260°C			date	03.02.2010	WIRING STANDARD RE 115 (220°C)	redLINE by BINDER	control system heating	model RE 115	=	
B	start W1009	05.03.2010	SME	edited	SME					+	
				tested	RME						
state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram	art.-No. 9090-0007	file 56791002.PRO	page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	mains cable 230VAC/10A	5023-0174	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Medium-Time-Lag M	5006-0012	1.2
5	-1Z1	capacitor 1-phase 230VAC	5026-0001	1.3
6	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
7	-2N1	controller 2132	5014-0139	2.7
8	-2E1	heating 230V / 1000W	5005-0153	2.11
9	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name
	thermal fuse 260°C		
B	start W1009	05.03.2010	SME

date	03.02.2010
edited	SME
tested	RME
norm	

WIRING STANDARD
RE 115 (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RE 115 | = | +

art.-No.: 9090-0007 | file: 56791002.PRO | page 1 | from 1 pg.

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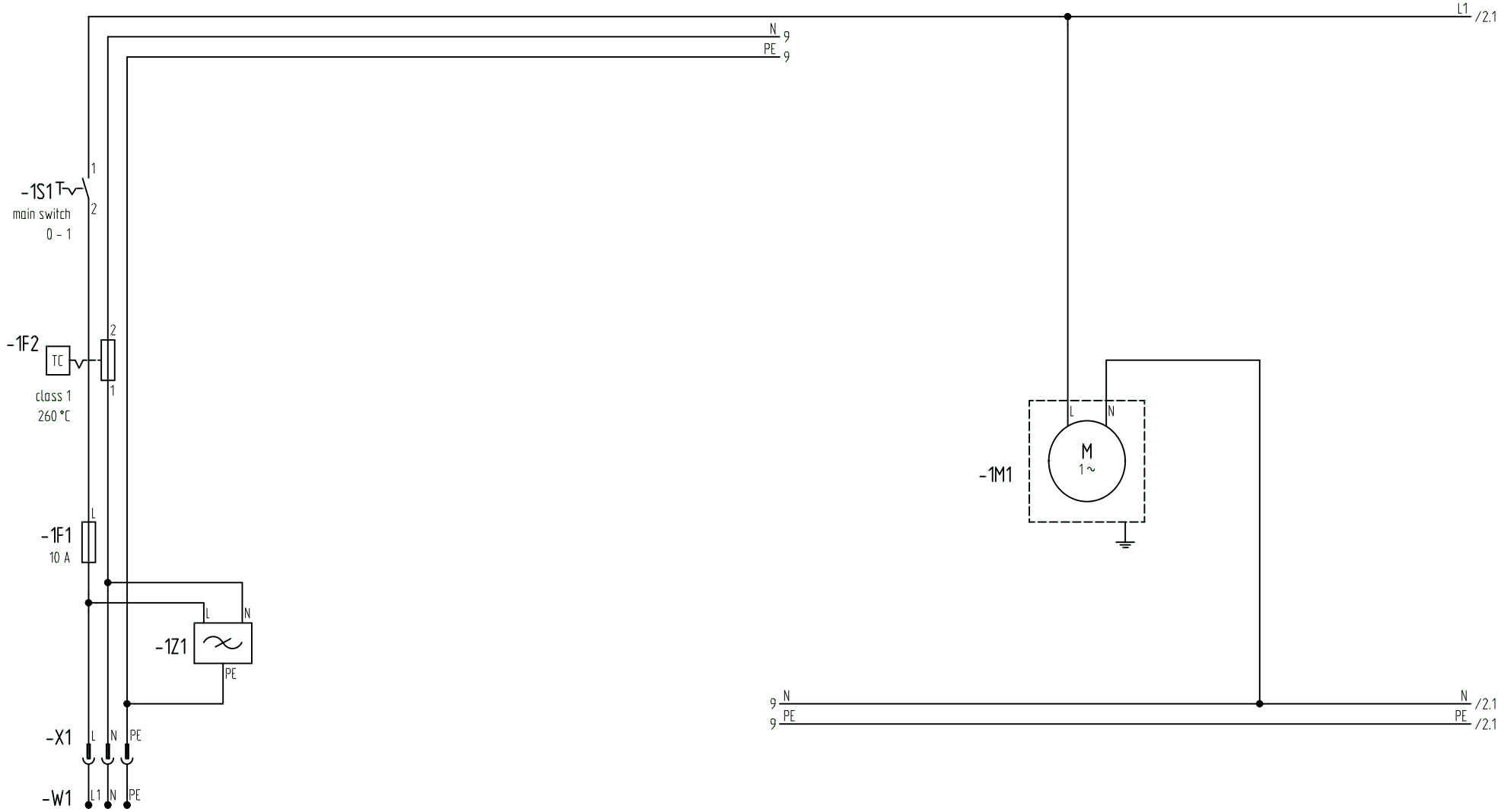

power-supply
230V/50Hz
1/N/PE

technical data
P= 0,80 kW
U= 230 V / 50 Hz
I= 3,5 A

main fan

state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram	model	RF 53	= / +
	thermal fuse 260°C and			date	03.02.2010	WIRING STANDARD RF 53 (220°C)		redLINE by BINDER	power-supply			
A	main fan start W1008	02.03.2010	SME	edited	SME					art.-No.	9090-0003	file 56821002.PRO
				tested	RME							page 1 from 2 pg.

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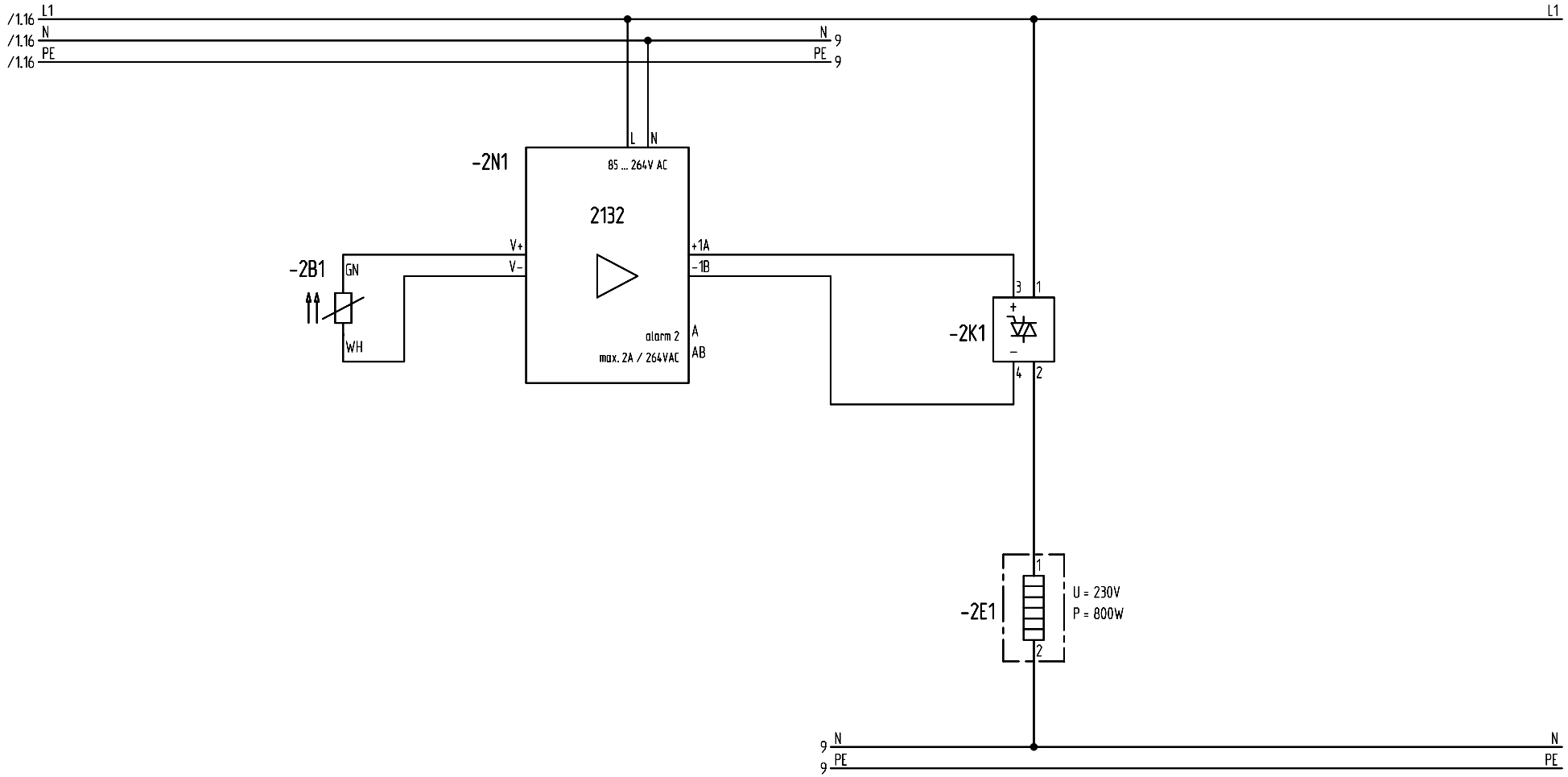

control temperature

heating

	thermal fuse 260°C and			date	03.02.2010	WIRING STANDARD RF 53 (220°C)	redLINE by BINDER	control system heating	model RF 53	=
A	main fan start W1008	02.03.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0003	file 56821002.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	mains cable 230VAC/10A	5023-0174	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Medium-Time-Lag M	5006-0012	1.2
5	-1Z1	capacitor 1-phase 230VAC	5026-0001	1.3
6	-1M1	radial fan (31W) 230V / 50Hz	5013-0043	1.12
7	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
8	-2N1	controller 2132	5014-0139	2.7
9	-2E1	heating 230V / 800W	5005-0144	2.11
10	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name
	thermal fuse 260°C and		
A	main fan start W1008	02.03.2010	SME

date	03.02.2010
edited	SME
tested	RME
norm	

WIRING STANDARD
RF 53 (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RF 53 | = | +

art.-No.: 9090-0003 | file: 56821002.PRO | page 1 | from 1 pg.

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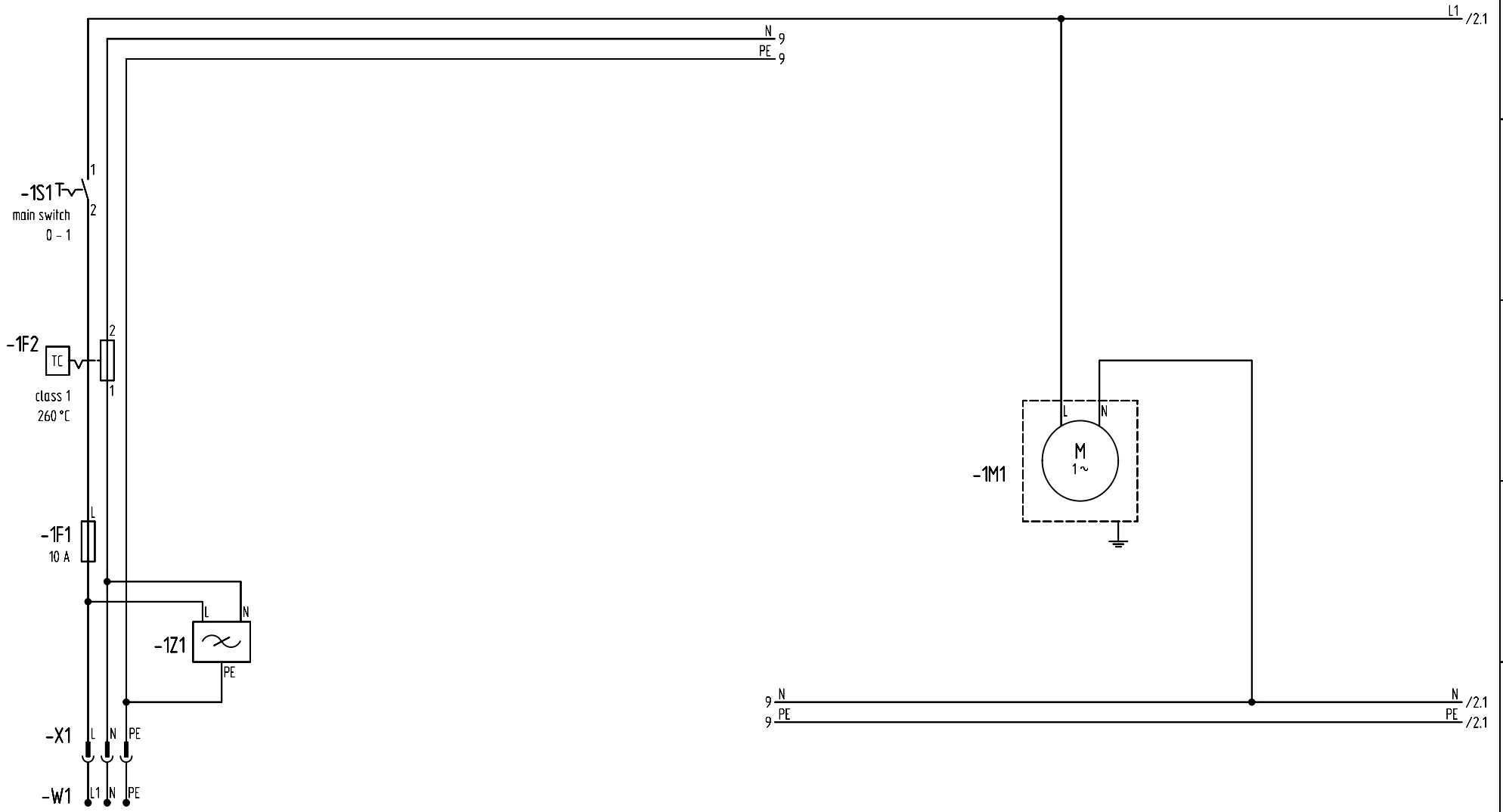

power-supply
230V/50Hz
1/N/PE

technical data
P= 1,00 kW
U= 230 V / 50 Hz
I= 4,4 A

main fan

	thermal fuse 260°C			date	03.02.2010	WIRING STANDARD RF 115 (220°C)	redLINE by BINDER	power-supply	model RF 115 = +
B	start W1009	05.03.2010	SME	edited	SME				
				tested	RME				art.-No. 9090-0009 file 56831002.PRO page 1 from 2 pg.
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram	

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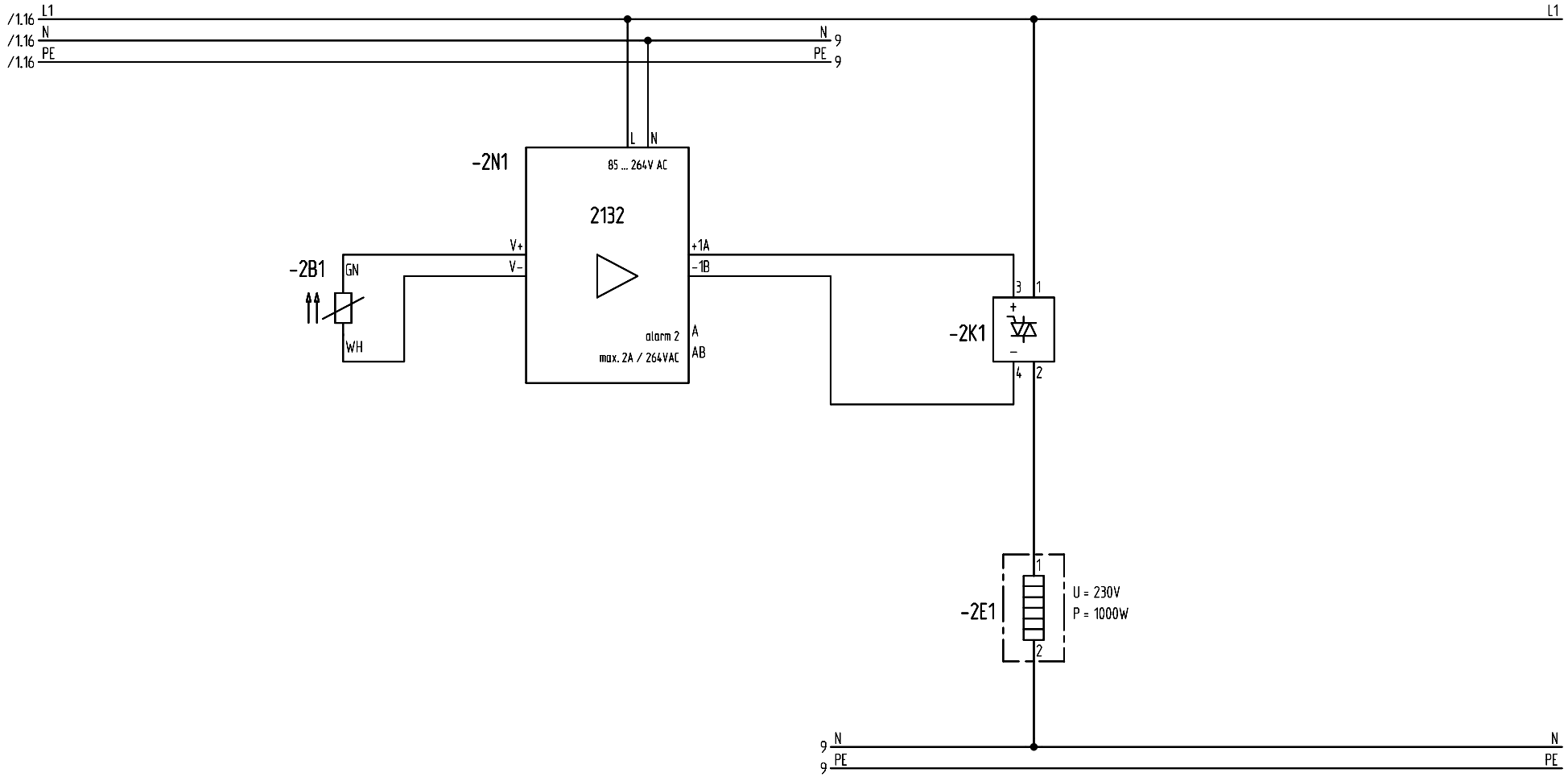

control temperature

heating

	thermal fuse 260°C			date	03.02.2010	WIRING STANDARD RF 115 (220°C)		control system heating	model	RF 115	=	
B	start W1009	05.03.2010	SME	edited	SME		redLINE by BINDER				+	
				tested	RME				art.-No.	9090-0009	file	56831002.PRO	page 2
state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram				from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	mains cable 230VAC/10A	5023-0174	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Medium-Time-Lag M	5006-0012	1.2
5	-1Z1	capacitor 1-phase 230VAC	5026-0001	1.3
6	-1M1	radial fan (40W) 230V / 50Hz	5013-0021	1.12
7	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
8	-2N1	controller 2132	5014-0139	2.7
9	-2E1	heating fan 230V / 1000W	5005-0154	2.11
10	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name
	thermal fuse 260°C		
B	start W1009	05.03.2010	SME

date	03.02.2010		
edited	SME		
tested	RME		
norm			

WIRING STANDARD
RF 115 (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RF 115 | = | +

art.-No.: 9090-0009 | file: 56831002.PRO | page 1 | from 1 pg.

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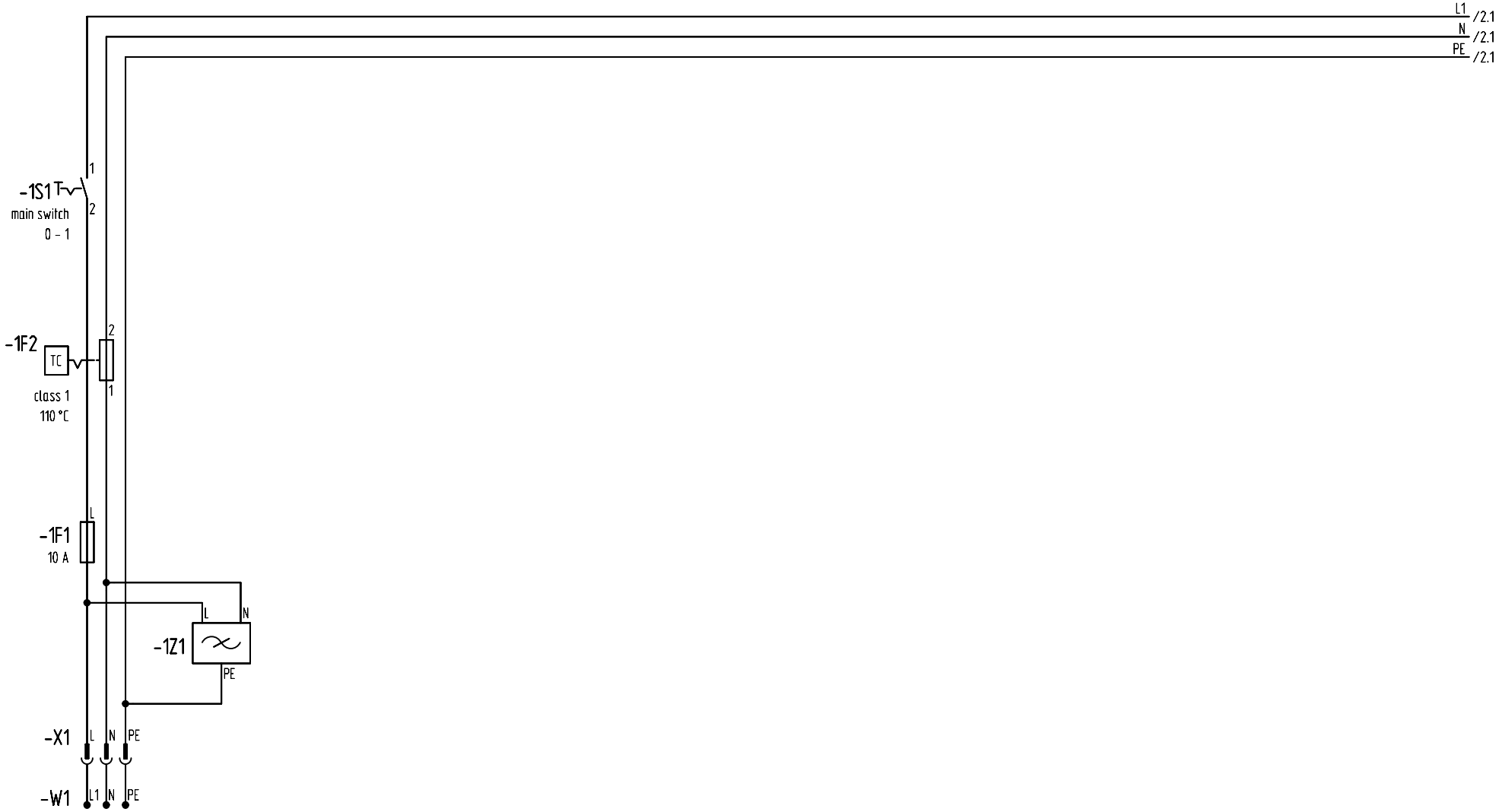

power-supply
230V/50Hz
1/N/PE

technical data
P= 0,20 kW
U= 230 V / 50 Hz
I= 0,9 A

state	change	date	name	norm	
	construction	17.09.2009	SME	date	03.02.2010
A	production start W0932	15.10.2009	SME	edited	SME
				tested	RME

WIRING STANDARD
RI 53 (70°C)

origin | substitude for | replaced by

redLINE by BINDER

power-supply
wiring diagram

model: RI 53
art.-No.: 9090-0005
file: 56861001.PRO

= / +

page 1 from 2 pg.

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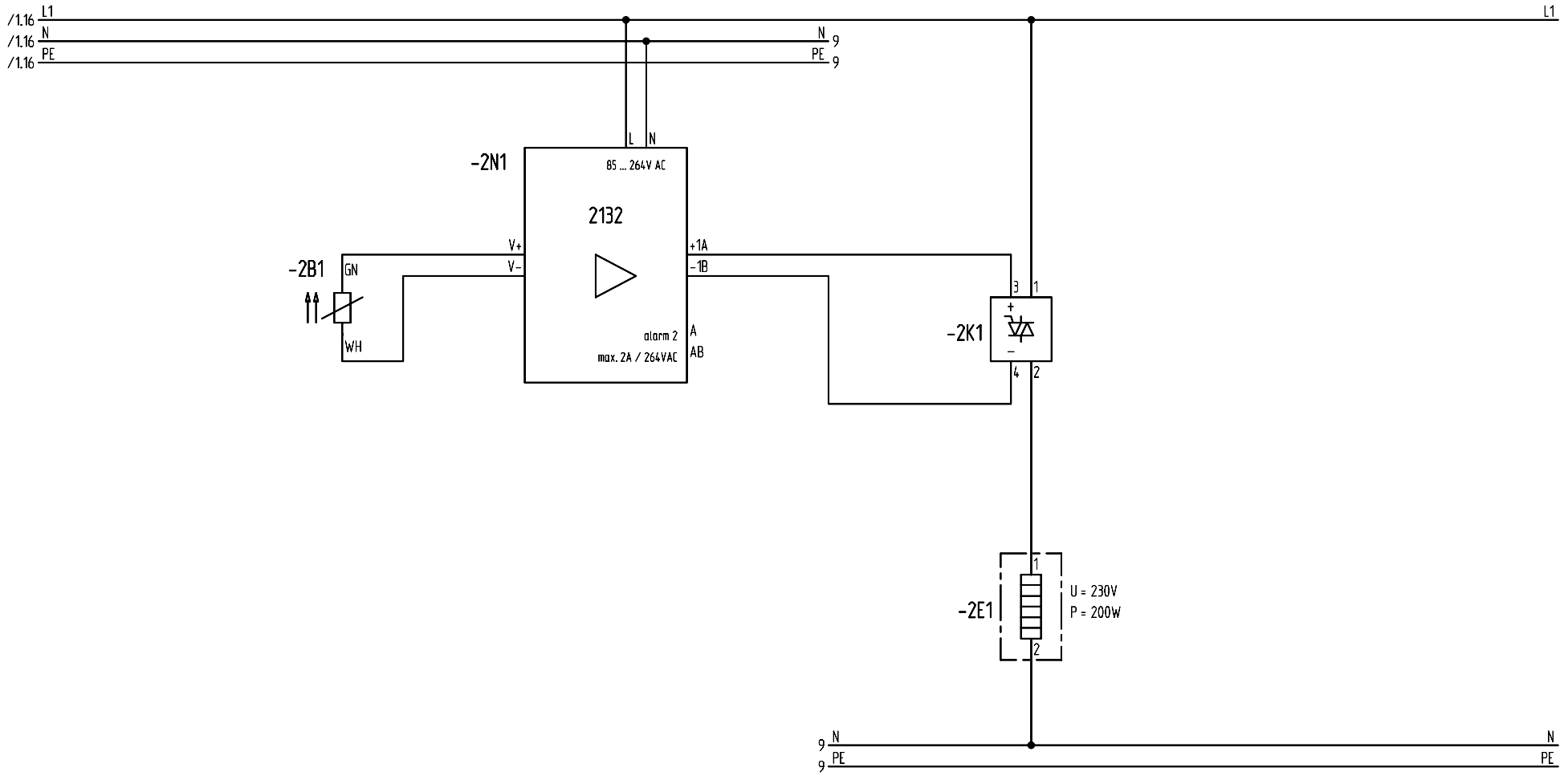

	construction	17.09.2009	SME	date	03.02.2010	WIRING STANDARD RI 53 (70°C)	redLINE by BINDER	control system heating	model RI 53	=	
A	production start W0932	15.10.2009	SME	edited	SME					+	
				tested	RME				art.-No. 9090-0005	file 56861001.PRO	page 2
state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram		from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 110°C (-7K)	5006-0043	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	mains cable 230VAC/10A	5023-0174	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Medium-Time-Lag M	5006-0012	1.2
5	-1Z1	capacitor 1-phase 230VAC	5026-0001	1.3
6	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
7	-2N1	controller 2132	5014-0139	2.7
8	-2E1	heating 230V / 200W	5005-0147	2.11
9	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	17.09.2009	SME	date	03.02.2010
A	production start W0932	15.10.2009	SME	edited	SME
				tested	RME

WIRING STANDARD
RI 53 (70°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RI 53

art.-No.: 9090-0005

file: 56861001.PRO

page 1 from 1 pg.

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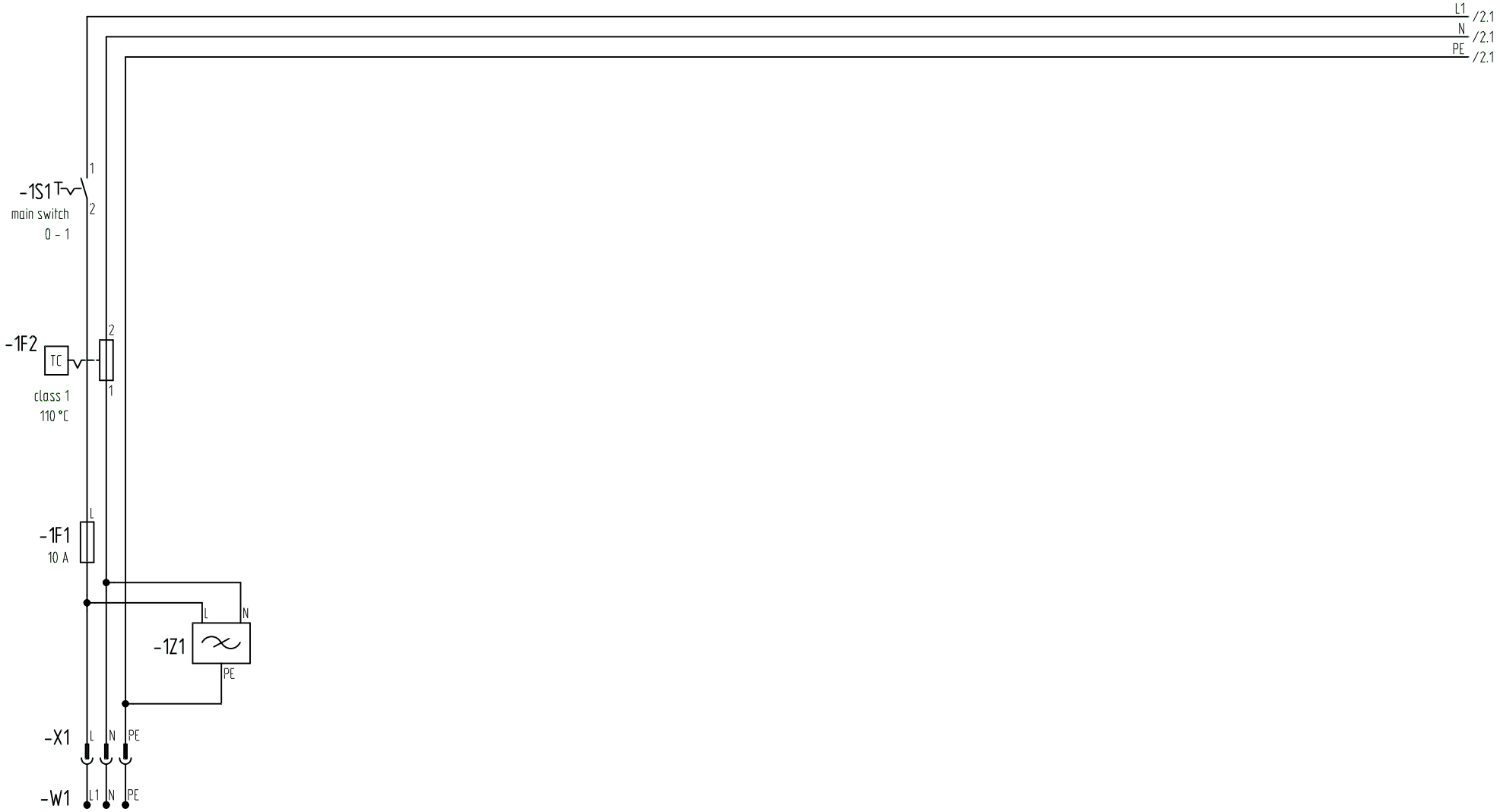

state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram			
	construction	17.09.2009	SME	date	03.02.2010	WIRING STANDARD RI 115 (70°C)		redLINE by BINDER	power-supply	model	RI 115	=
A	production start W0933	23.10.2009	SME	edited	SME							+
				tested	RME					art.-No.	9090-0011	file 56871001.PRO
												page 1 from 2 pg.

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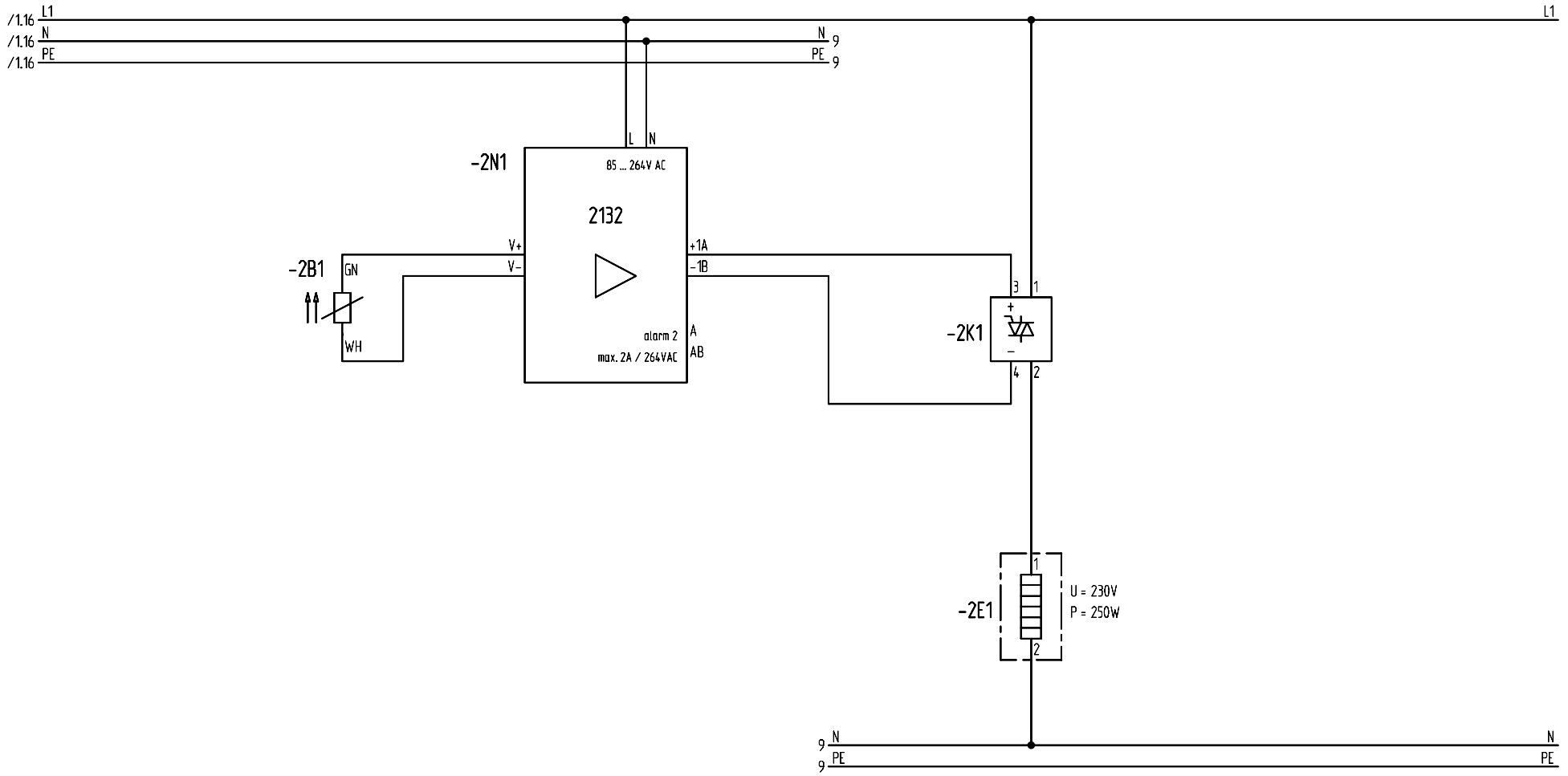

control temperature

heating

	construction	17.09.2009	SME	date	03.02.2010	WIRING STANDARD RI 115 (70°C)	redLINE by BINDER	control system heating	model RI 115	=
A	production start W0933	23.10.2009	SME	edited	SME					+
				tested	RME				art.-No. 9090-0011	file 56871001.PRO
state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram	page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 110°C (-7K)	5006-0043	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	mains cable 230VAC/10A	5023-0174	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Medium-Time-Lag M	5006-0012	1.2
5	-1Z1	capacitor 1-phase 230VAC	5026-0001	1.3
6	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
7	-2N1	controller 2132	5014-0139	2.7
8	-2E1	heating 230V / 250W	5005-0152	2.11
9	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	17.09.2009	SME	date	03.02.2010
A	production start W0933	23.10.2009	SME	edited	SME
				tested	RME

WIRING STANDARD
RI 115 (70°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RI 115

art.-No.: 9090-0011

file: 56871001.PRO

page 1 from 1 pg.

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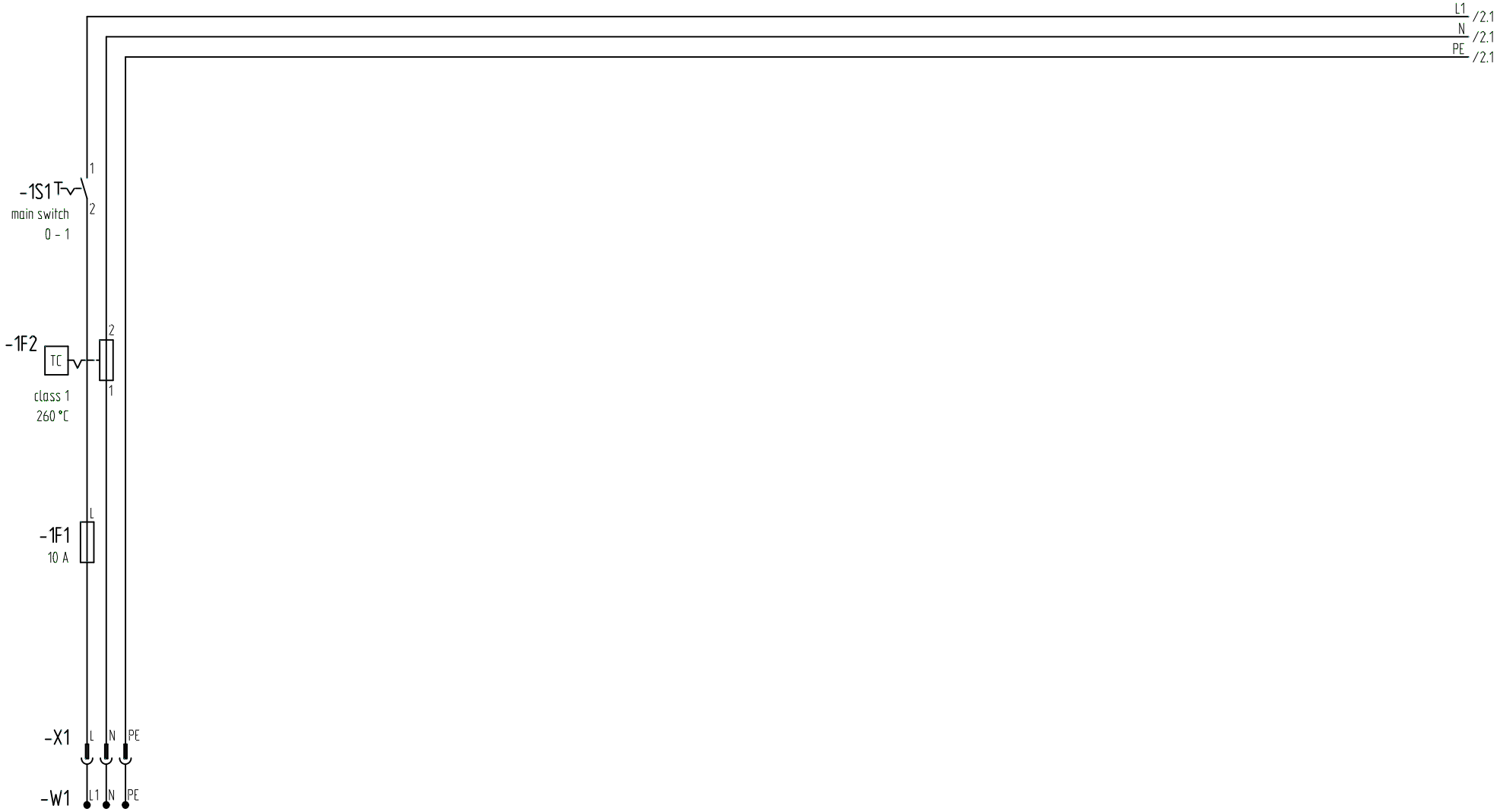

power-supply
100-120V/50-60Hz
1/N/PE

technical data
P= 0,80 kW
U= 100-120 V / 50-60 Hz
I= 6,7 A

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RE 53 - UL (220°C)	redLINE by BINDER	power-supply	model RE 53 - UL	=	
A	production start W1015	23.04.2010	SME	edited	SME					+	
				tested	RME				art.-No. 9090-0002	file 56781501.PRO	page 1
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram			from 2 pg.

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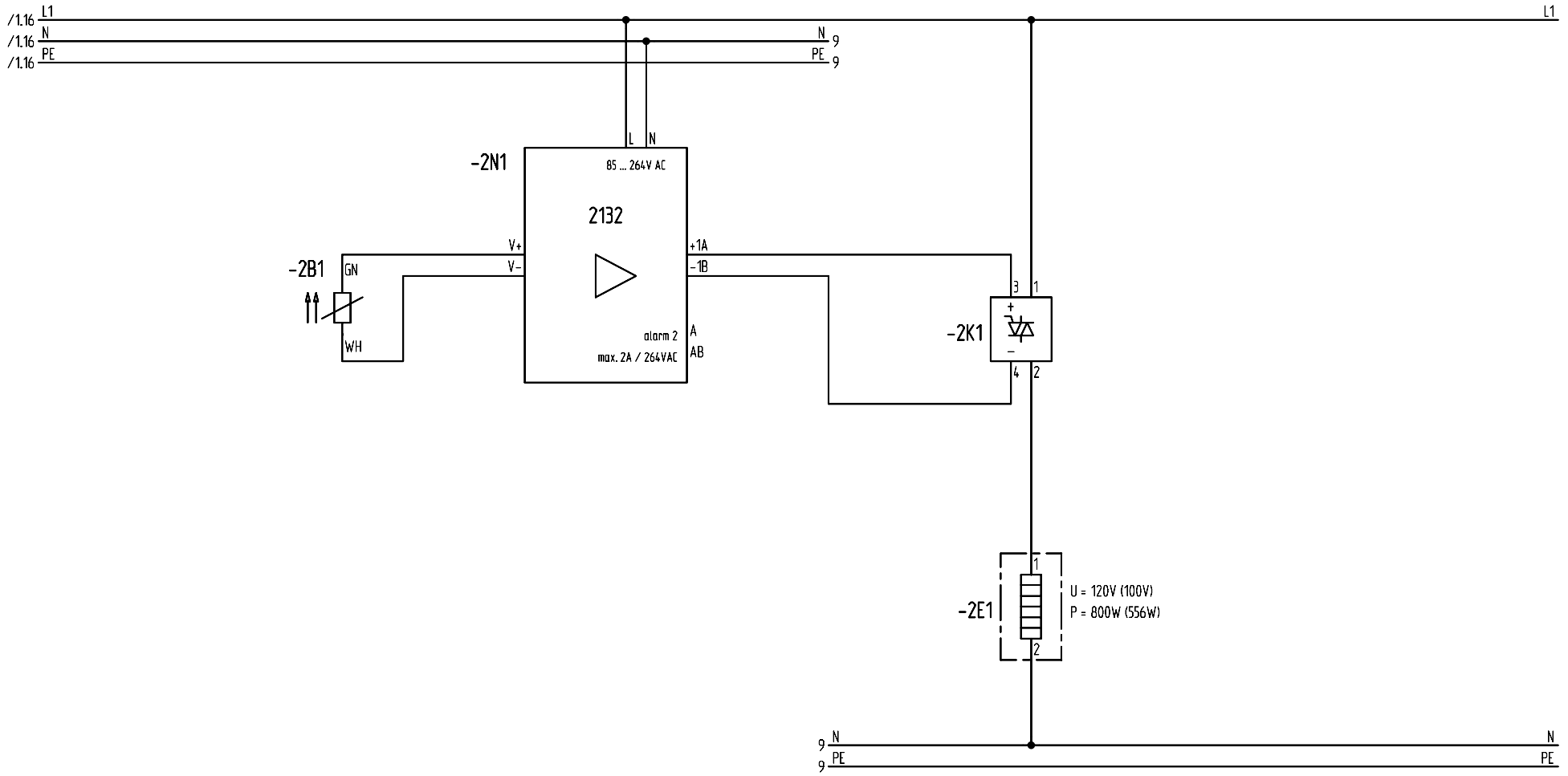

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RE 53 – UL (220°C)	redLINE by BINDER	control system heating	model RE 53 – UL	=
A	production start W1015	23.04.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0002	file 56781501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	power cord 115VAC/10A	5023-0175	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Time-Lag T	5006-0079	1.2
5	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
6	-2N1	controller 2132	5014-0139	2.7
7	-2E1	heating 120V / 800W	5005-0197	2.11
8	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	06.10.2009	SME	date	31.03.2010
A	production start W1015	23.04.2010	SME	edited	SME
				tested	RME

WIRING STANDARD
RE 53 - UL (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RE 53 - UL

art.-No.: 9090-0002 | file: 56781501.PRO | page 1 from 1 pg.

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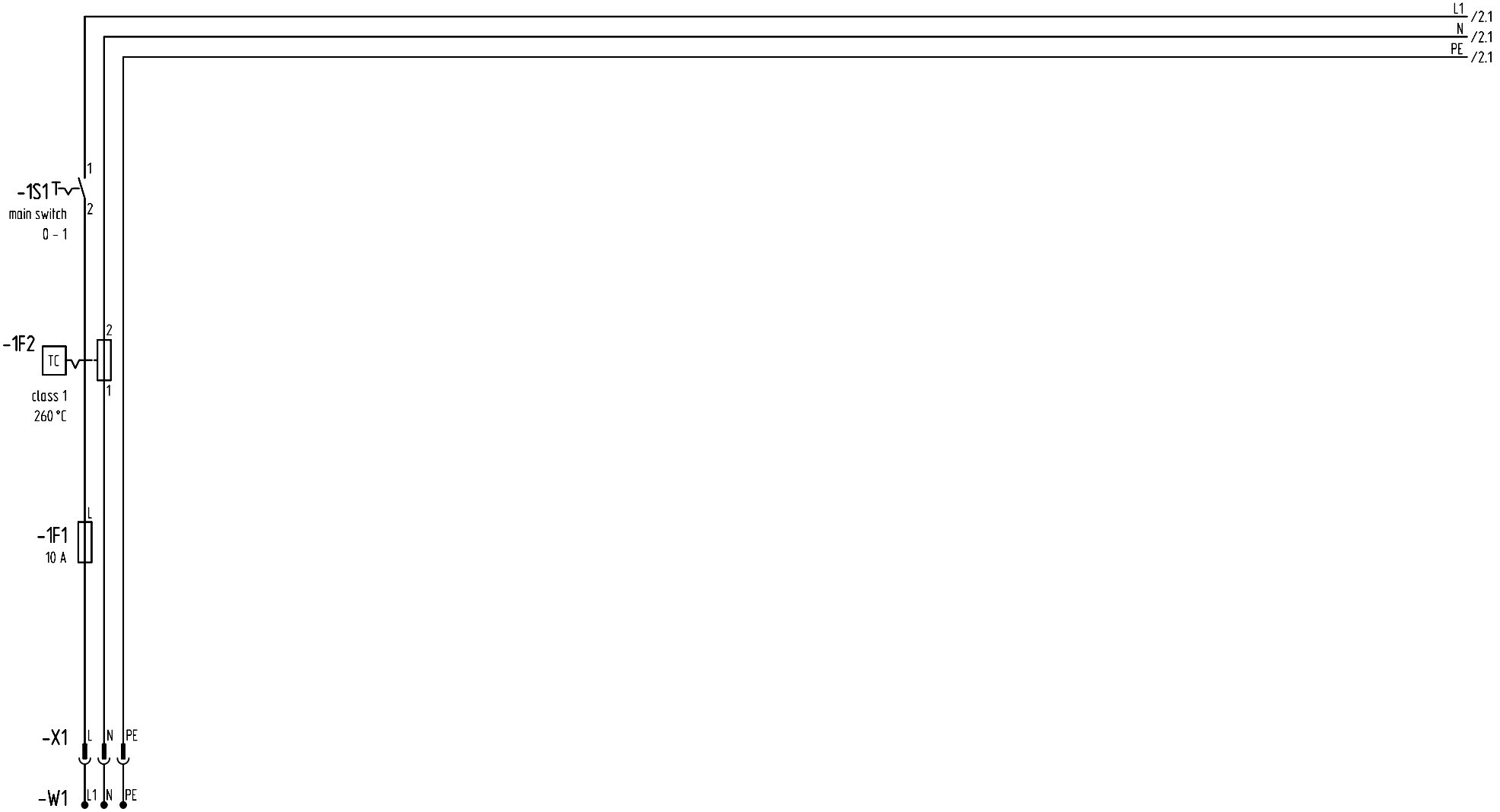

power-supply
100-120V/50-60Hz
1/N/PE

technical data
P= 1,00 kW
U= 100-120 V / 50-60 Hz
I= 8,3 A

state	change	date	name	norm		origin	substitude for
	construction	06.10.2009	SME	date	31.03.2010		
A	production start W1016	27.04.2010	SME	edited	SME		
				tested	RME		

WIRING STANDARD
RE 115 - UL (220°C)

redLINE by BINDER

replaced by

power-supply
wiring diagram

model: RE 115 - UL
art.-No.: 9090-0008
file: 56791501.PRO
page 1 from 2 pg.

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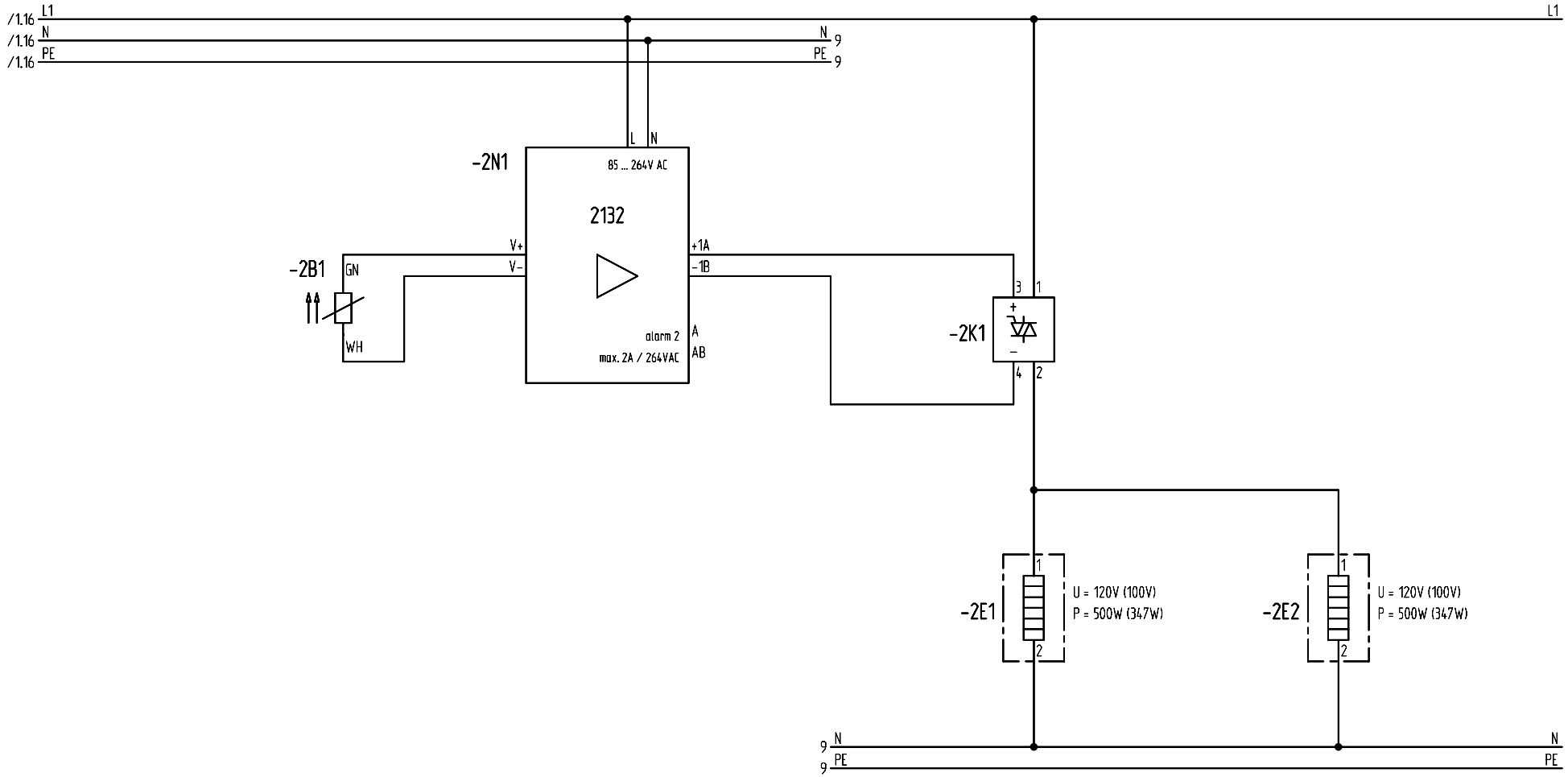

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RE 115 - UL (220°C)	redLINE by BINDER	control system heating	model RE 115 - UL	=
A	production start W1016	27.04.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0008	file 56791501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	power cord 115VAC/10A	5023-0175	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Time-Lag T	5006-0079	1.2
5	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
6	-2N1	controller 2132	5014-0139	2.7
7	-2E1	heating 120V / 500W	5005-0196	2.11
8	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11
9	-2E2	heating 120V / 500W	5005-0196	2.14

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state	change	date	name	norm	
	construction	06.10.2009	SME	date	31.03.2010
A	production start W1016	27.04.2010	SME	edited	SME
				tested	RME

WIRING STANDARD
RE 115 - UL (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RE 115 - UL

art.-No.: 9090-0008 | file: 56791501.PRO | page 1 from 1 pg.

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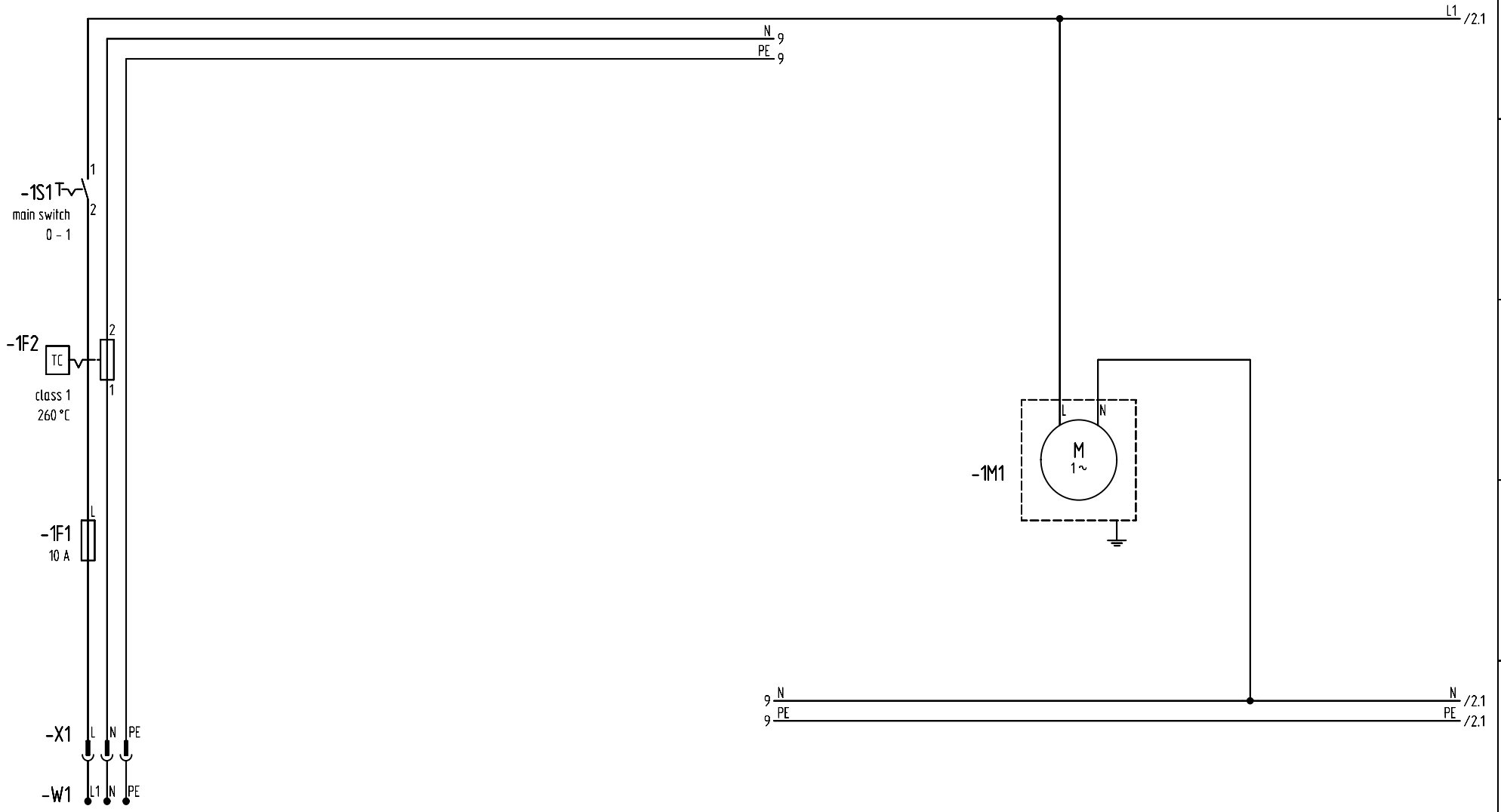

power-supply
100-120V/50-60Hz
1/N/PE

technical data
P= 0,80 kW
U= 100-120 V / 50-60 Hz
I= 6,7 A

main fan

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RF 53 - UL (220°C)	redLINE by BINDER	power-supply	model RF 53 - UL	=
A	production start W1015	23.04.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0004	file 56821501.PRO
state	change	date	name	norm		origin	substitude for	replaced by	wiring diagram	page 1 from 2 pg.

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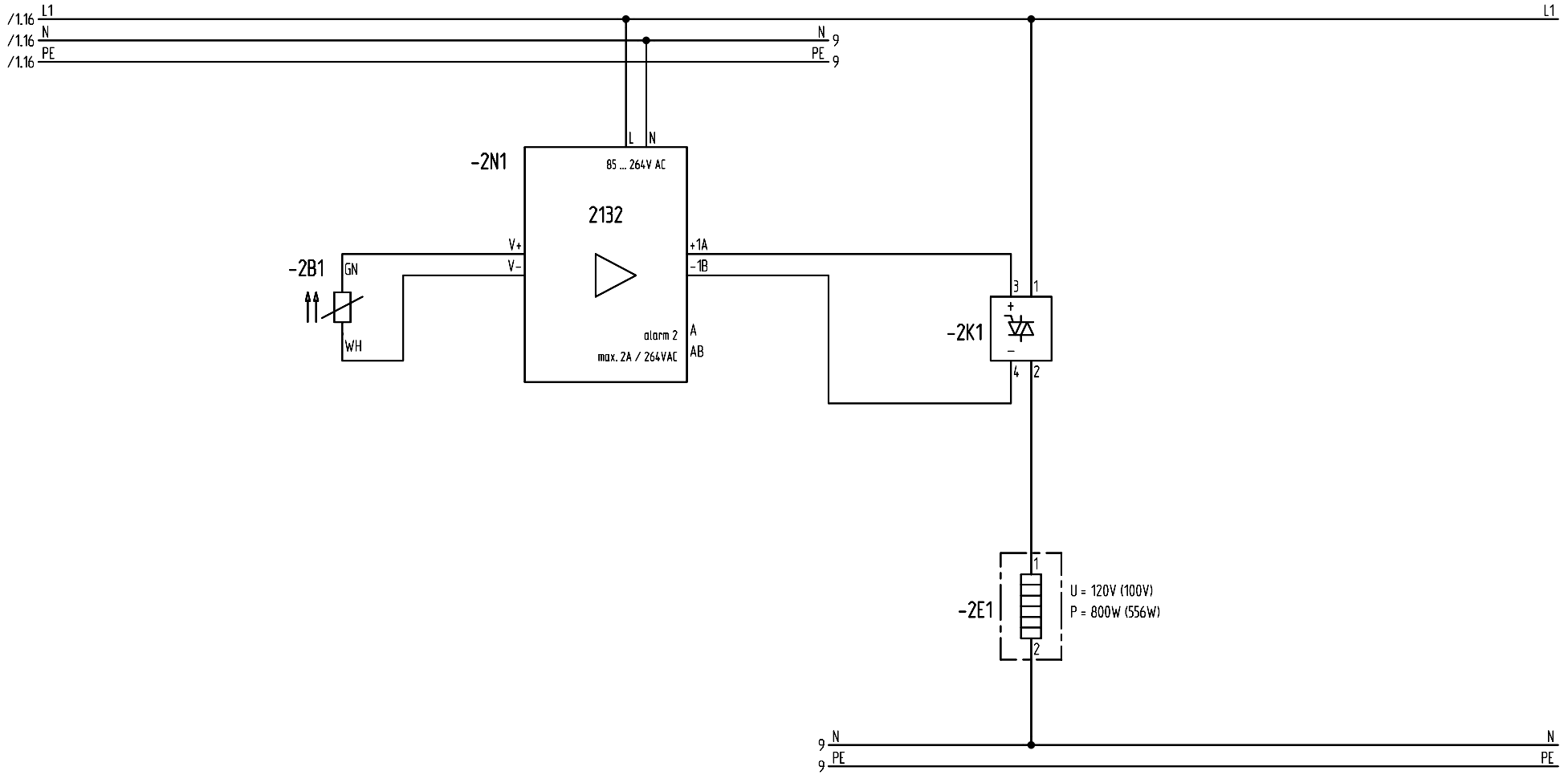

control temperature

heating

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RF 53 - UL (220°C)	redLINE by BINDER	control system heating	model RF 53 - UL	=
A	production start W1015	23.04.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0004	file 56821501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	power cord 115VAC/10A	5023-0175	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Time-Lag T	5006-0079	1.2
5	-1M1	radial fan (50W) 115V / 60Hz	5013-0044	1.12
6	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
7	-2N1	controller 2132	5014-0139	2.7
8	-2E1	heating 120V / 800W	5005-0195	2.11
9	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	06.10.2009	SME	date	31.03.2010
A	production start W1015	23.04.2010	SME	edited	SME
				tested	RME

WIRING STANDARD
RF 53 - UL (220°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RF 53 - UL

art.-No.: 9090-0004

file: 56821501.PRO

page 1 from 1 pg.

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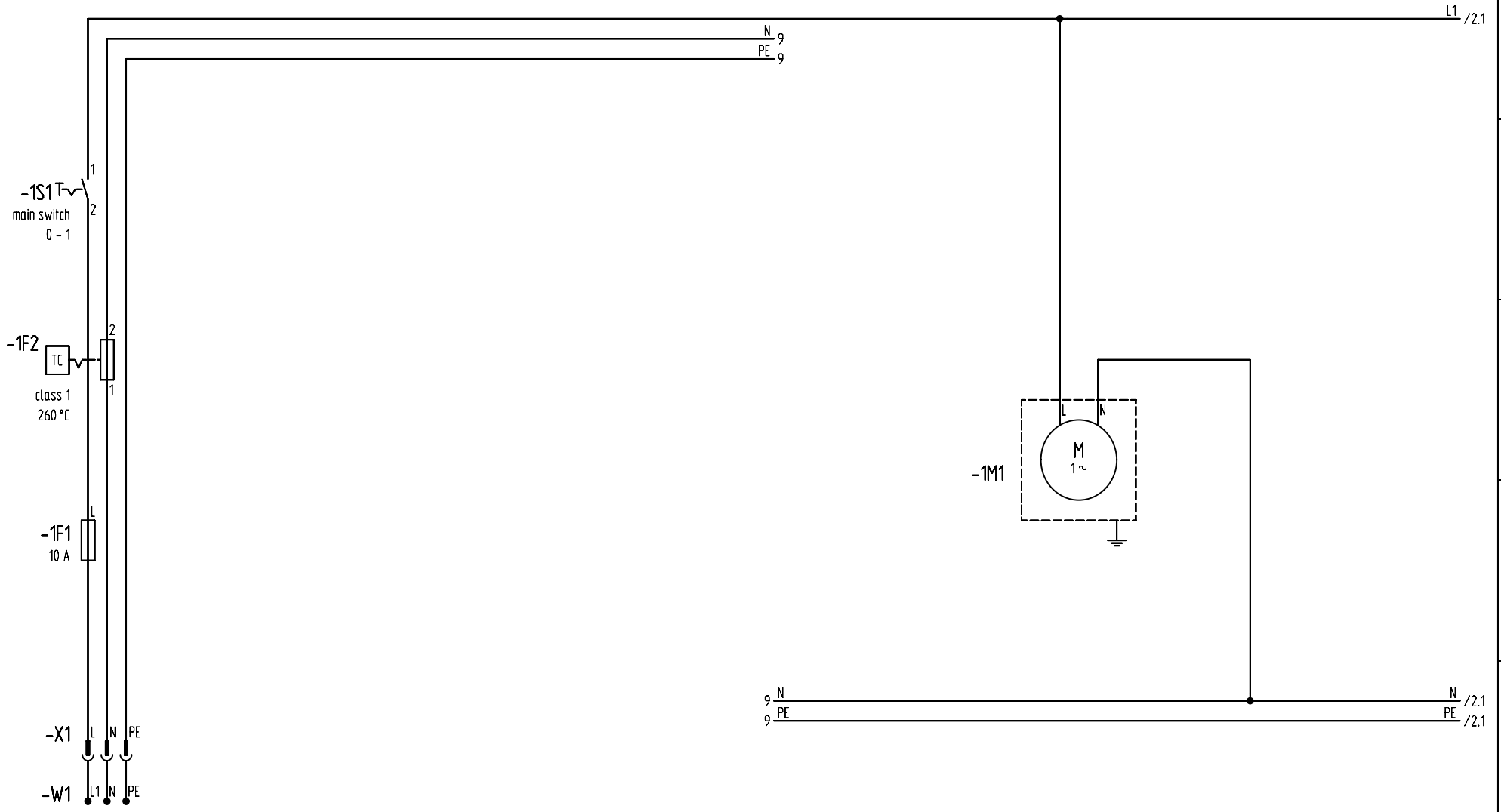

power-supply
100-120V/50-60Hz
1/N/PE

technical data
P= 1,00 kW
U= 100-120 V / 50-60 Hz
I= 8,3 A

main fan

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RF 115 - UL (220°C)	redLINE by BINDER	power-supply	model RF 115 - UL	=
A	production start W1016	05.02.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0010	file 56831501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 1 from 2 pg.

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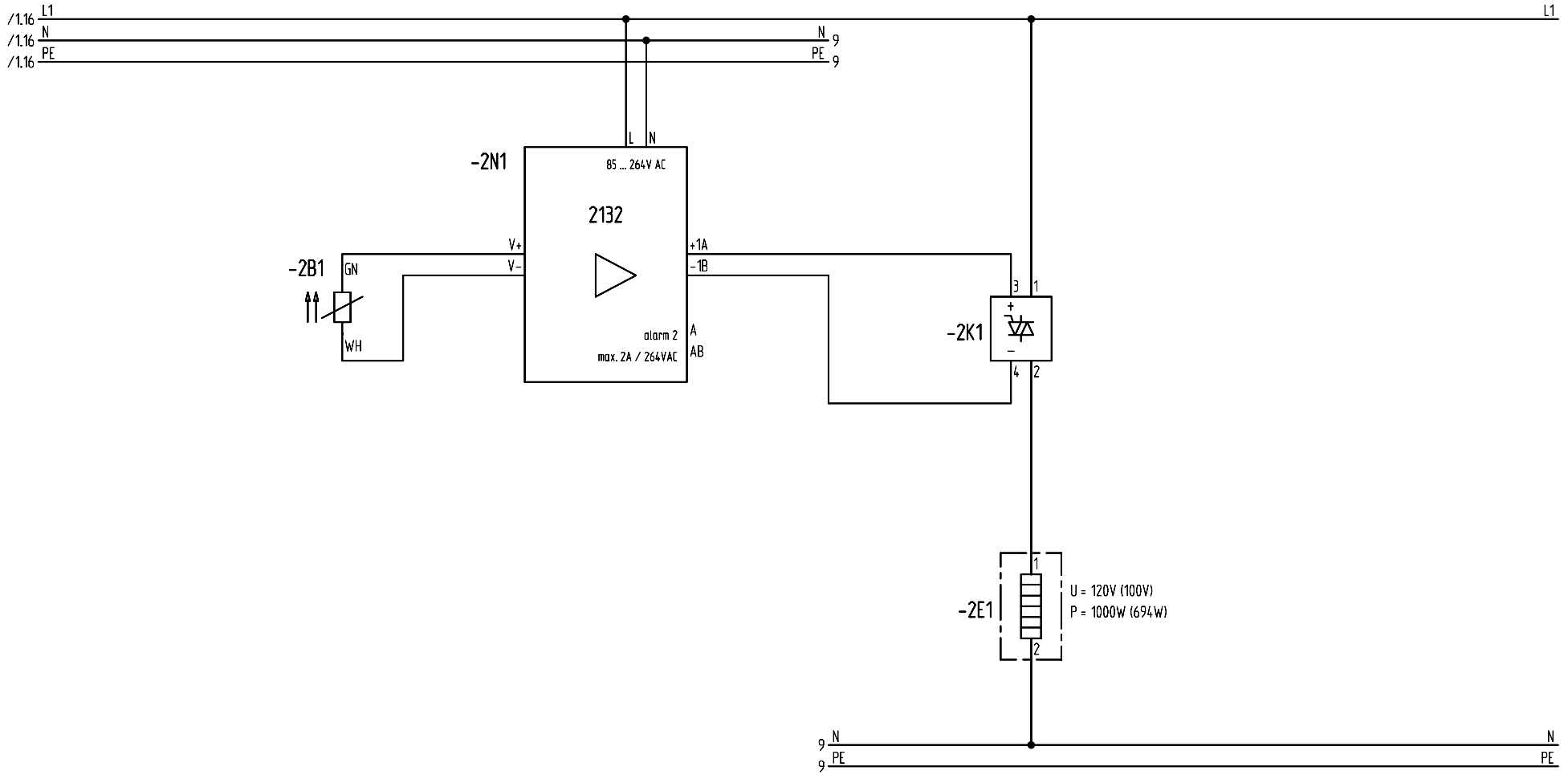

control temperature

heating

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RF 115 - UL (220°C)	redLINE by BINDER	control system heating	model RF 115 - UL	=
A	production start W1016	05.02.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0010	file 56831501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 260°C (-10K)	5006-0080	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	power cord 115VAC/10A	5023-0175	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Time-Lag T	5006-0079	1.2
5	-1M1	radial fan (70W) 115V / 60Hz	5013-0047	1.12
6	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
7	-2N1	controller 2132	5014-0139	2.7
8	-2E1	heating 120V / 1000W	5005-0194	2.11
9	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	06.10.2009	SME	date	31.03.2010
A	production start W1016	05.02.2010	SME	edited	SME
				tested	RME

origin | substitude for | replaced by | production parts list

WIRING STANDARD
RF 115 - UL (220°C)

redLINE by BINDER

model: RF 115 - UL

art.-No.: 9090-0010

file: 56831501.PRO

page 1 from 1 pg.

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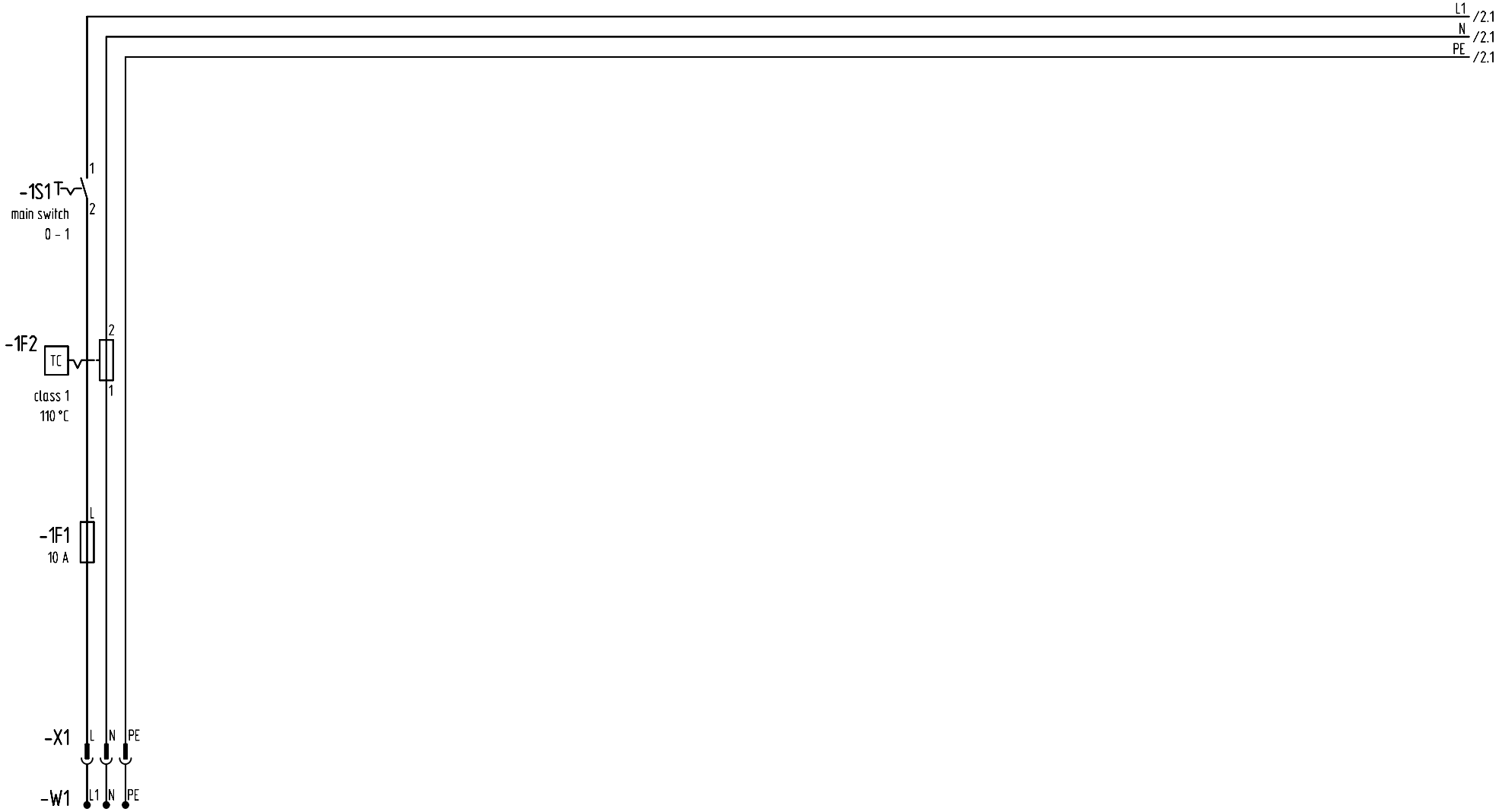

power-supply
100-120V/50-60Hz
1/N/PE

technical data
P= 0,25 kW
U= 100-120 V / 50-60 Hz
I= 2,1 A

state	change	date	name	norm		origin	substitude for
	construction	06.10.2009	SME	date	31.03.2010		
A	production start W1015	23.04.2010	SME	edited	SME		
				tested	RME		

WIRING STANDARD
RI 53 - UL (70°C)

redLINE by BINDER

replaced by

power-supply
wiring diagram

model: RI 53 - UL
art.-No.: 9090-0006
file: 56861501.PRO
page 1 from 2 pg.

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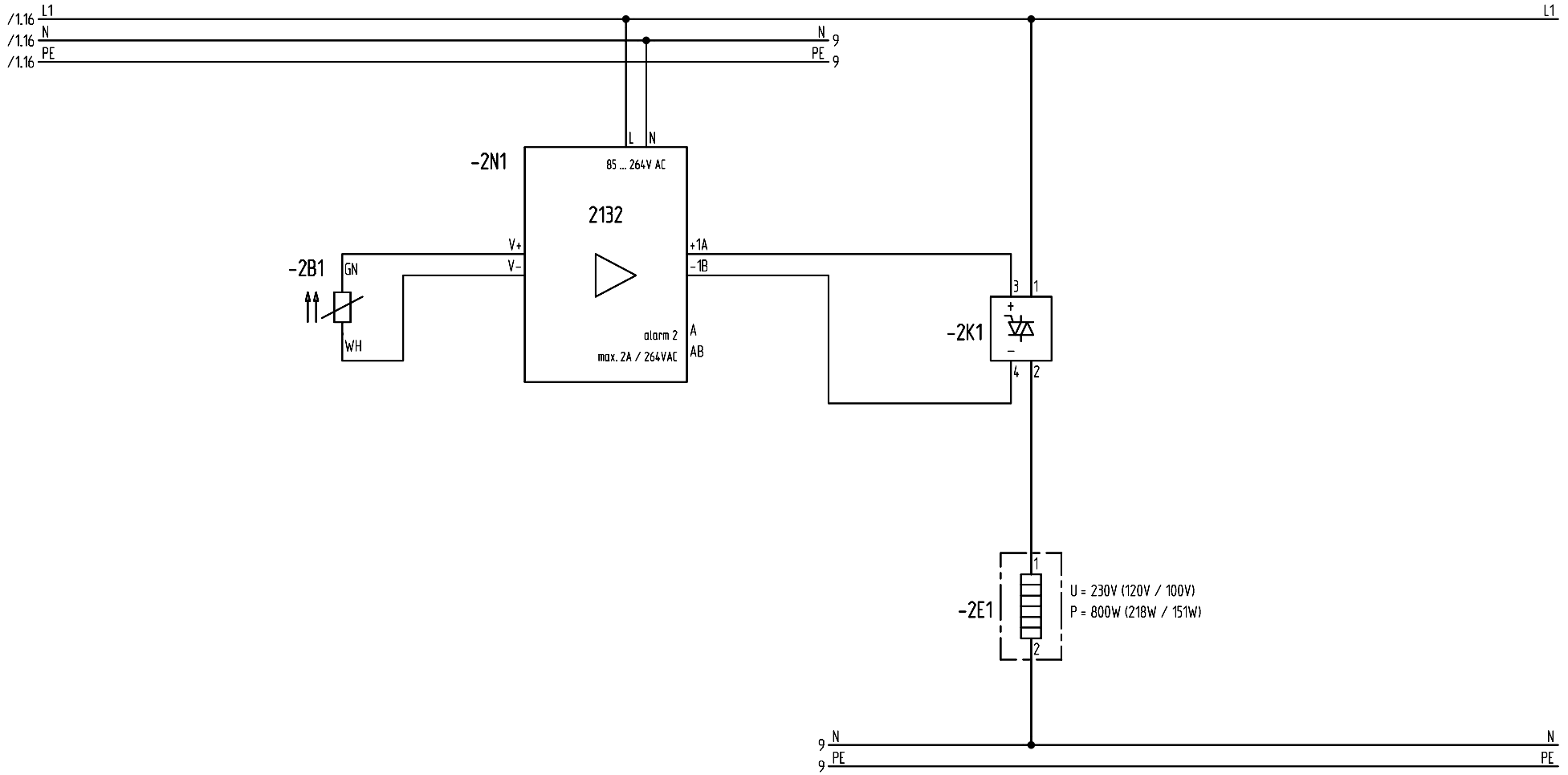

control temperature

heating

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RI 53 - UL (70°C)	redLINE by BINDER	control system heating	model RI 53 - UL	=
A	production start W1015	23.04.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0006	file 56861501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 110°C (-7K)	5006-0043	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	power cord 115VAC/10A	5023-0175	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Time-Lag T	5006-0079	1.2
5	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
6	-2N1	controller 2132	5014-0139	2.7
7	-2E1	heating 230V / 800W	5005-0143	2.11
8	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	06.10.2009	SME	date	31.03.2010
A	production start W1015	23.04.2010	SME	edited	SME
				tested	RME

WIRING STANDARD
RI 53 - UL (70°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RI 53 - UL

art.-No.: 9090-0006 | file: 56861501.PRO | page 1 from 1 pg.

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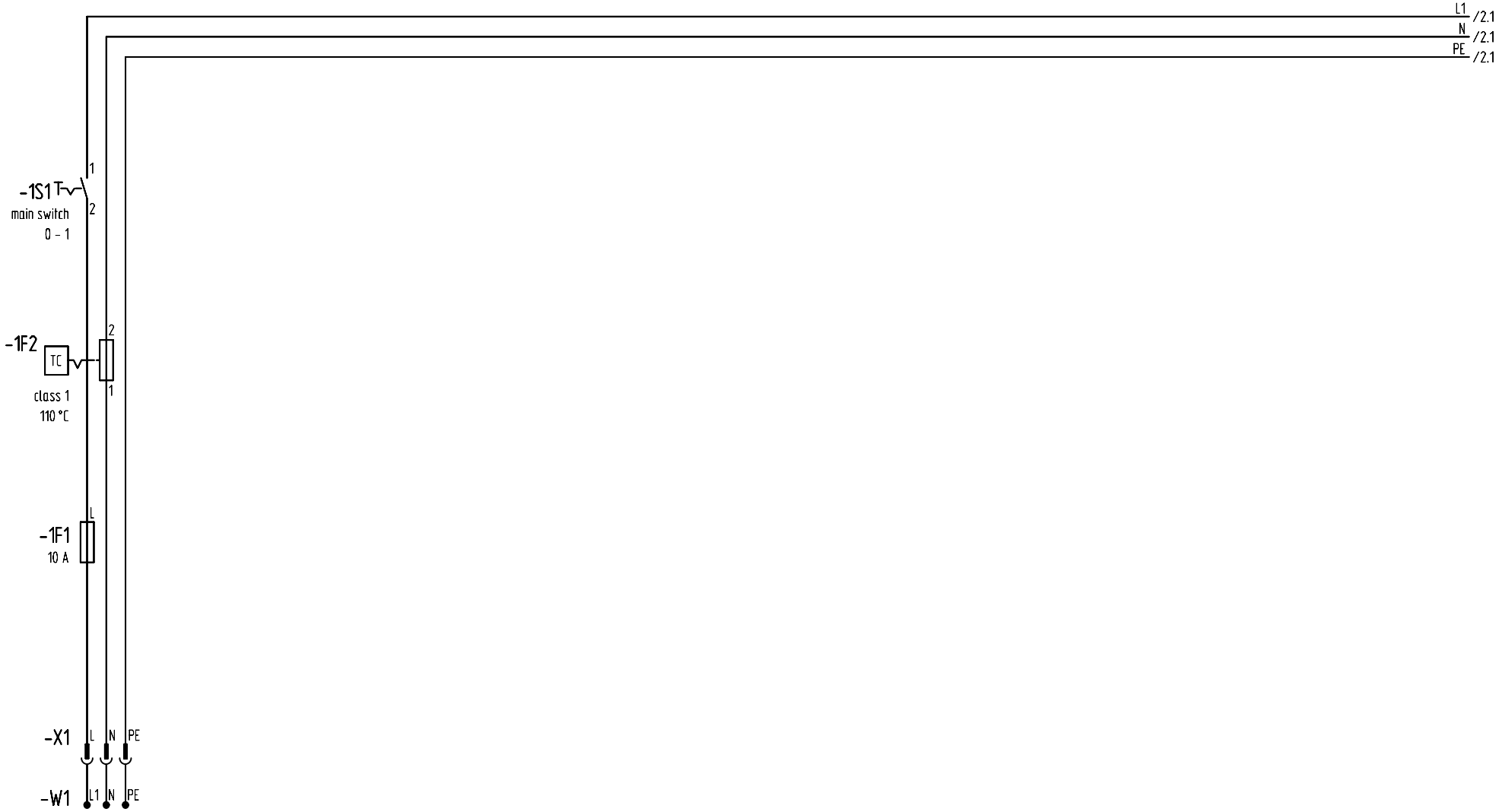

power-supply
100-120V/50-60Hz
1/N/PE

technical data
P= 0,30 kW
U= 100-120 V / 50-60 Hz
I= 2,5 A

state	change	date	name	norm		origin	substitude for
	construction	06.10.2009	SME	date	31.03.2010		
A	production start W1016	27.04.2010	SME	edited	SME		
				tested	RME		

WIRING STANDARD
RI 115 - UL (70°C)

redLINE by BINDER

replaced by

power-supply
wiring diagram

model: RI 115 - UL
art.-No.: 9090-0012
file: 56871501.PRO
page 1 from 2 pg.

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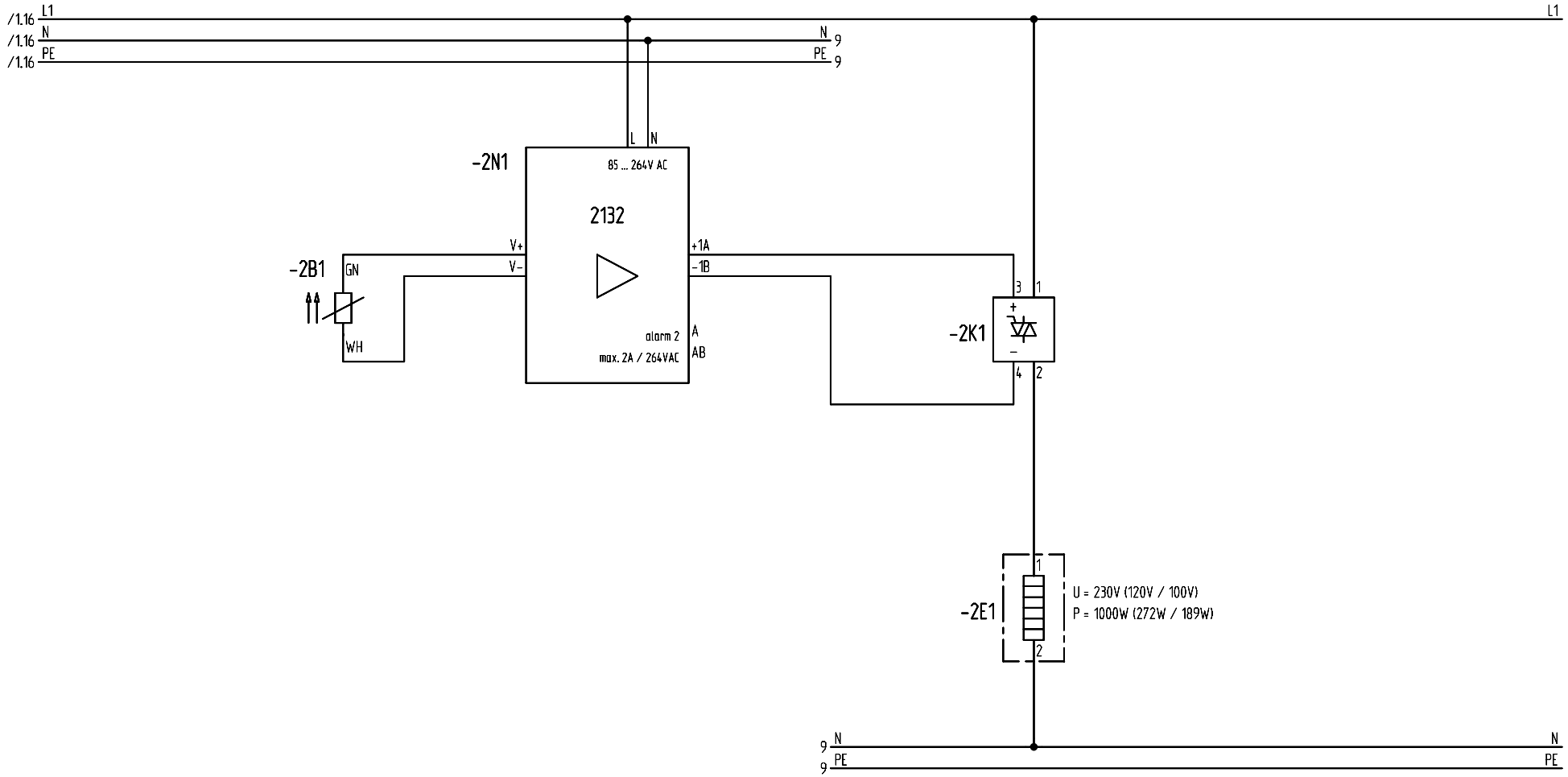

control temperature

heating

	construction	06.10.2009	SME	date	31.03.2010	WIRING STANDARD RI 115 - UL (70°C)	redLINE by BINDER	control system heating	model RI 115 - UL	=
A	production start W1016	27.04.2010	SME	edited	SME					+
				tested	RME				art.-No. 9090-0012	file 56871501.PRO
state	change	date	name	norm		origin / substitude for	replaced by	wiring diagram		page 2 from 2 pg.

position	marking	designation	part number	location
1	-1F2	thermal fuse 110°C (-7K)	5006-0043	1.2
2	-1S1	rocker switch (1NO) 230VAC	5019-0019	1.2
3	-W1	power cord 115VAC/10A	5023-0175	1.2
4	-X1	IEC connector + fuse		1.2
		IEC connector + fuseholder	5024-0205	1.2
		fuse 10A / 250V Time-Lag T	5006-0079	1.2
5	-2B1	thermocouple NiCr-Ni "K"	5002-0061	2.4
6	-2N1	controller 2132	5014-0139	2.7
7	-2E1	heating 230V / 1000W	5005-0153	2.11
8	-2K1	solid state relay (1S / 25A) 264VAC/10VDC	5011-0060	2.11

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state	change	date	name	norm	
	construction	06.10.2009	SME	date	31.03.2010
A	production start W1016	27.04.2010	SME	edited	SME
				tested	RME

WIRING STANDARD
RI 115 - UL (70°C)

origin | substitude for | replaced by | production parts list

redLINE by BINDER

model: RI 115 - UL

art.-No.: 9090-0012 | file: 56871501.PRO

page 1 from 1 pg.